



Environment

Submitted to:
Encana Oil & Gas (USA) Inc.
Denver, Colorado

Submitted by:
AECOM
Fort Collins, Colorado
60221849.400
February 2012

Pavillion Natural Gas Field, Fremont County, Wyoming, Encana Oil & Gas (USA) Inc.

2011 Pit Investigation Report – Tribal Pavillion 21-9



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List of Acronyms

AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
DRO	diesel range organics
Encana	Encana Oil & Gas (USA), Inc.
ESC	Environmental Science Corporation
GRO	gasoline range organics
IME	Inberg Miller Engineers
mg/kg	milligrams per kilogram
OCSRRS	Oil Contaminated Soil Remediation Ranking System
PID	photoionization detector
ppm	parts per million
SAR	sodium adsorption ratio
SHWD	Solid and Hazardous Waste Division
SVOC	semi-volatile organic compounds
TP	Tribal Pavillion
TPH	total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
WDEQ	Wyoming Department of Environmental Quality
WOGCC	Wyoming Oil and Gas Conservation Commission

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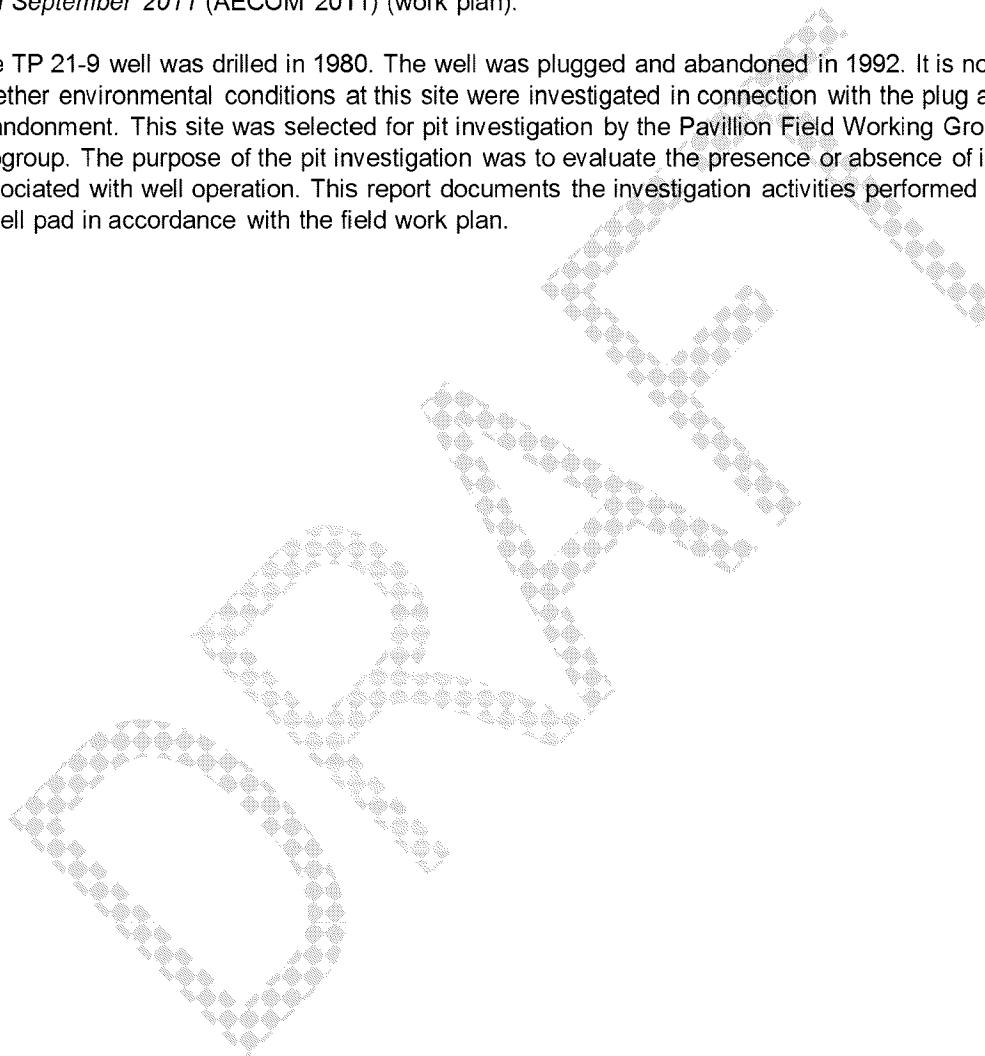
Figure 2-1 Site Layout

Figure 3-1 Soil Analytical Results

1.0 Introduction

This investigation report has been prepared by AECOM Technical Services, Inc. (AECOM) on behalf of Encana Oil & Gas (USA) Inc. (Encana). The purpose of this report is to summarize the results of the site investigation activities performed at the Tribal Pavillion 21-9 (TP 21-9) pit location within the Pavillion Natural Gas Field east of the town of Pavillion, Fremont County, Wyoming (see **Figure 1-1** for a site location map). The work activities completed at the pit site were detailed in the August 18, 2011 *Draft Pavillion Natural Gas Field, Fremont County, Wyoming, Field Work Plan for Site Investigations – August and September 2011* (AECOM 2011) (work plan).

The TP 21-9 well was drilled in 1980. The well was plugged and abandoned in 1992. It is not known whether environmental conditions at this site were investigated in connection with the plug and abandonment. This site was selected for pit investigation by the Pavillion Field Working Group, Pit subgroup. The purpose of the pit investigation was to evaluate the presence or absence of impacts associated with well operation. This report documents the investigation activities performed at the TP 21-9 well pad in accordance with the field work plan.



2.0 Summary of Field Activities

The primary field activities conducted at TP 21-9 included: utility clearance; soil boring advancement and soil sampling; and final field surveying of all boreholes and temporary monitoring wells.

2.1 Ground Disturbance Activities

In accordance with Encana's Ground Disturbance Practice, all utilities within a 100 foot radius search area were marked. All utilities within 15 feet of a proposed ground disturbance location were positively identified using air and water excavation.

2.2 Soil Assessment

Fourteen soil borings were advanced at the site using direct-push drilling technology following utility clearance. The borings were advanced to locate and evaluate the historic pit location. The soil borings SB-1-11 (TP 21-9) through SB-14-11 (TP 21-9) were advanced near the perimeter and in the central portion of the well pad as shown in **Figure 2-1**. Drilling activities were performed by Inberg Miller Engineers (IME) of Riverton, Wyoming, on August 25, 2011. Each soil boring was logged by a field geologist. Photoionization detector (PID) headspace readings were collected and recorded at approximately 2-foot intervals. Copies of the soil boring logs are provided in **Appendix A**.

Thirteen of the soil borings were advanced to a depth of 15 feet below ground surface (bgs). One soil boring was advanced to 20 feet bgs. Groundwater was not encountered in soil borings with the exception of SB-8-11 (TP 21-9). Groundwater was encountered at approximately 15 feet bgs in SB-8-11 (TP 21-9). A temporary monitoring well was not constructed at this location because a potential for groundwater impacts was not identified based on the PID results below 100 ppm and lack of visual observations of impacts in boring SB-8-11 (TP 21-9). The maximum PID readings at 12 of the 14 soil borings were at 50 parts per million (ppm) or below. The PID readings above 100 ppm were measured from soil boring SB-3-11 (TP 21-9) (6 to 8 feet bgs) at 211 ppm, and from SB-12-11 (TP 21-9) (8 to 10 feet bgs) at 166 ppm.

One soil sample from each boring was collected from the 0 to 1 foot bgs interval for analysis of sodium adsorption ratio (SAR). One soil sample from each boring was collected at the 13 to 15 feet bgs interval for analysis of total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and diesel range organics (DRO), as required by the Wyoming Oil and Gas Conservation Commission (WOGCC). One sample was collected for analysis of benzene, toluene, ethyl benzene, and total xylenes (BTEX) from each soil boring with a PID reading greater than 100 ppm. One sample was collected for analysis of semi-volatile organic compounds (SVOC) from the soil sample interval with the highest PID measurement. The analysis conducted on each boring is provided below.

- SB-1-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-2-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-3-11 (TP 21-9) – Two samples were collected for TPH analysis; one sample was collected for TPH, BTEX, and SVOC analyses; and one sample for SAR analysis;
- SB-4-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-5-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;

- SB-6-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-7-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-8-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-9-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-10-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-11-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis;
- SB-12-11 (TP 21-9) – One sample was collected for TPH analysis, one sample was collected for TPH and BTEX analyses, and one sample for SAR analysis;
- SB-13-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis; and
- SB-14-11 (TP 21-9) – One sample was collected for TPH analysis and one sample for SAR analysis.

All soil samples were submitted to Environmental Science Corporation (ESC) of Mt. Juliet, Tennessee, for laboratory analysis. Analysis of TPH-GRO and TPH-DRO was completed using U.S. Environmental Protection Agency (USEPA) Method 8015. Analysis of BTEX was completed using USEPA Method 8260B. Analysis of SVOC was completed using USEPA Method 8270C. A discussion of analytical results is provided in **Section 3.1**.

All soil borings were surveyed and are shown on **Figure 2-1**. Soil borings SB-1-11 (TP 21-9) through SB-14-11 (TP 21-9) were plugged and abandoned using hydrated bentonite chips.

3.0 Analytical Sample Summary

3.1 Soil Sample Results

The soil sampling TPH results are compared to 1,000 milligrams per kilogram (mg/kg). This concentration represents the most stringent cleanup level identified by the WOGCC "Guideline for Closure of Unlined Production Pits". Concentrations of SVOC were compared to the residential soil cleanup level and the migration to groundwater cleanup level, both based on the Wyoming Department of Environmental Quality/Solid and Hazardous Waste Division (WDEQ/SHWD) cleanup level spreadsheet effective June 30, 2009. SAR results were compared to background sample results using USEPA ProUCL 4.0. Analytical soil sample results are summarized in **Table 3-1** and are shown in **Figure 3-1**. A copy of the laboratory report is provided in **Appendix C**.

TPH-GRO was detected in the SB-3-11 (TP 21-9) and SB-12-11 (TP 21-9) soil samples. TPH-DRO was detected in the SB-3-11 (TP 21-9), SB-12-11 (TP 21-9), and SB-14-11 (TP 21-9). The TPH detections exceeded WOGCC cleanup levels identified in the "Guideline for Closure of Unlined Production Pits". Certain SVOCs were detected in the soil sample SB-3-11 (TP 21-9). All of the detected SVOC concentrations were below applicable cleanup levels. A cleanup level was not identified for the SVOC phenanthrene. BTEX was not detected in any of the soil samples.

Sodium Adsorption Ration

A background evaluation of two sets of soil SAR data was conducted. One set included 13 background data points collected at locations within the Pavillion Natural Gas Field. All background data points were collected outside of well pad boundaries. The other set included 25 site data points collected from the WE Lloyd #1, Pavillion Fee 31-9, and TP 21-9 well sites. This number of samples is sufficient for a valid statistical analysis. The background and site SAR data used for this evaluation is provided in **Table 3-2**. All background data was pooled into a "background" population. All site data was pooled into a "site" population. The objective of the evaluation was to determine if the "background" data and the "site" data can be considered from the same population (i.e., the site data is not unusually higher or lower than the background).

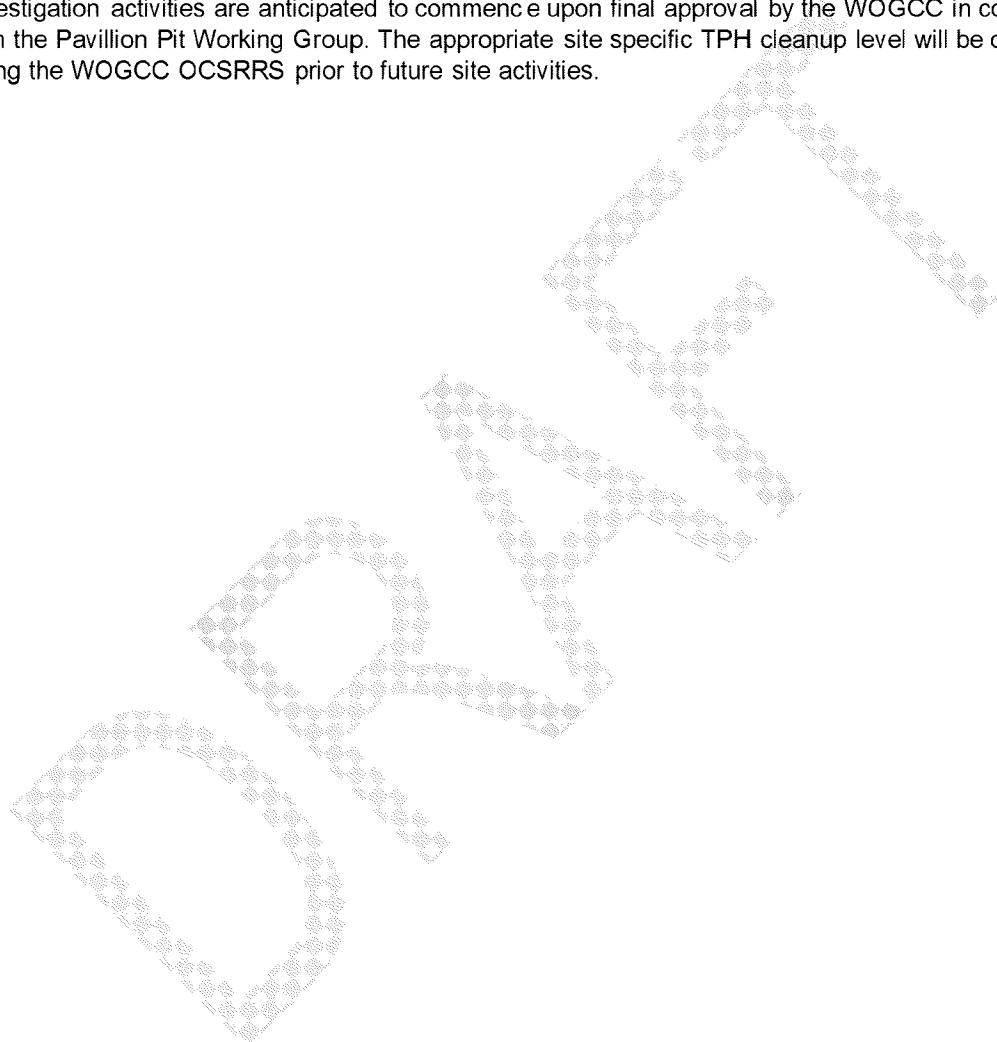
The test was run using the module for background data hypothesis testing available in the USEPA ProUCL 4.0. The tested hypothesis was that the site mean was equal to the background mean. A two-sided test was selected since SAR can be either lower or higher than the site data. The initial F-test confirms that variances were equal as shown in **Table 3-3**. This confirms the appropriate statistical test is the Two-Sample t-test assuming equal variance.

Table 3-3 shows the output of the statistical test, Two-Sample t-test. The test shows that the hypothesis that the two populations have equal means cannot be rejected, at a confidence level of 0.95. Therefore, it is concluded that the background and site populations are not significantly different.

4.0 Discussion

Analytical results at the site indicate that soil TPH concentrations are above the WOGCC cleanup guidelines. Given the elevated TPH results, further investigation is necessary within the northwestern area near SB-3-11 (TP 21-9). The extent of further investigation will be determined using the WOGCC Oil Contaminated Soil Remediation Ranking System (OCSRRS) in accordance with the WOGCC "Guideline for Closure of Unlined Production Pits."

A work plan detailing the northwestern investigation effort will be developed under separate cover. Investigation activities are anticipated to commence upon final approval by the WOGCC in collaboration with the Pavillion Pit Working Group. The appropriate site specific TPH cleanup level will be determined using the WOGCC OCSRRS prior to future site activities.



5.0 References

AECOM. 2011. Pavillion Natural Gas Field, Fremont County, Wyoming, Encana Oil & Gas (USA) Inc., Field Work Plan for Site Investigations – August and September 2011. August 2011.



Tables



DRAFT - Table 3-1 - Soil Sample Analytical Results, August 2011
 Tribal Pavillion 21-9, Pavillion Natural Gas Field, Wyoming

Sample Name				SB-1-11	SB-1-11	SB-2-11	SB-2-11	SB-3-11	SB-3-11	SB-3-11 ¹	SB-3-11	SB-4-11	SB-4-11	SB-5-11	SB-5-11	SB-6-11	SB-6-11	SB-7-11	SB-7-11	
Sample Depth (feet)				0-1	13-15	0-1	13-15	0-1	4-6	6-8	13-15	0-1	13-15	0-1	13-15	0-1	13-15	0-1	13-15	
Sample Date				8/25/2011	8/25/2011	8/25/2011	8/25/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	
Results																				
Analyte	Units	Method	Residential Soil Cleanup Level ³ (mg/kg)	Migration to Groundwater Cleanup Level ³ (mg/kg)																
Sodium Adsorption Ratio (SAR)	N/A	Calc.	NA ⁴	NA ⁴	17	--	18	--	5.6	--	--	--	5.9	--	3.4	--	2.9	--	7.7	--
TPH (GC/FID) Low Fraction	mg/kg	GRO	1,000 (Combined) ²	8015	--	< 0.50	--	< 0.50	--	41	1	< 0.50	--	< 0.50	--	< 0.50	--	< 0.50	--	< 0.50
TPH (GC/FID) High Fraction (DRO Wyoming C10-32)	mg/kg				--	< 4.0	--	< 4.0	--	18000	11000	47	--	< 4.0	--	< 4.0	--	< 4.0	--	< 4.0
Benzene	mg/kg	8260B	1.1	0.00023	--	--	--	--	--	< 0.050	--	--	--	--	--	--	--	--	--	--
Toluene	mg/kg	8260B	5,000	1.7	--	--	--	--	--	< 0.25	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	mg/kg	8260B	5.7	0.0019	--	--	--	--	--	< 0.050	--	--	--	--	--	--	--	--	--	--
Total Xylenes	mg/kg	8260B	600	0.23	--	--	--	--	--	< 0.15	--	--	--	--	--	--	--	--	--	--
Acenaphthene	mg/kg	8270C	3,400	27	--	--	--	--	--	3.1	--	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	8270C	17,000	450	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	8270C	2,300	33	--	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	8270C	NA	NA	--	--	--	--	--	11	--	--	--	--	--	--	--	--	--	--
Other Semi-Volatile Organic Compounds (SVOC)	mg/kg	8270C	Note ³	Note ³	--	--	--	--	--	Not Detected ¹	--	--	--	--	--	--	--	--	--	--

DRAFT - Table 3-1 - Soil Sample Analytical Results, August 2011

Tribal Pavillion 21-9, Pavillion Natural Gas Field, Wyoming

Sample Name			SB-8-11	SB-8-11	SB-9-11	SB-9-11	SB-10-11	SB-10-11 1	SB-11-11	SB-11-11	SB-12-11	SB-12-11	SB-12-11	SB-13-11	SB-13-11	SB-14-11	SB-14-11		
Sample Depth (feet)			0-1	13-15	0-1	13-15	0-1	13-15	0-1	13-15	0-1	8-10	13-15	0-1	13-15	0-1	13-15		
Sample Date			8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011	8/26/2011		
Analyte	Units	Method	Residential Soil Cleanup Level ³ (mg/kg)	Migration to Groundwater Cleanup Level ³ (mg/kg)	Results														
Sodium Adsorption Ratio (SAR)	N/A	Calc.	NA ⁴	NA ⁴	2.2	--	12	--	26	--	21	--	4.2	--	--	3.8	--	6.5	--
TPH (GC/FID) Low Fraction	mg/kg	GRO	--	< 0.50	--	< 0.50	--	< 0.50	--	< 0.50	--	9.3	< 0.50	--	< 0.50	--	< 0.50	--	
TPH (GC/FID) High Fraction (DRO Wyoming C10-32)	mg/kg	8015	1,000 (Combined) ²	--	< 4.0	--	< 4.0	--	< 4.0	--	< 4.0	--	240	< 4.0	--	< 4.0	--	4.5	--
Benzene	mg/kg	8260B		1.1	0.00023	--	--	--	--	--	--	--	< 0.050	--	--	--	--	--	--
Toluene	mg/kg	8260B	5,000	1.7	--	--	--	--	--	--	--	--	< 0.25	--	--	--	--	--	--
Ethylbenzene	mg/kg	8260B	5.7	0.0019	--	--	--	--	--	--	--	--	< 0.050	--	--	--	--	--	--
Total Xylenes	mg/kg	8260B	600	0.23	--	--	--	--	--	--	--	--	< 0.15	--	--	--	--	--	--
Acenaphthene	mg/kg	8270C	3,400	27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	8270C	17,000	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	8270C	2,300	33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	8270C	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Semi-Volatile Organic Compounds (SVOC)	mg/kg	8270C	Note ³	Note ³	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

= not analyze; < = sample result is less than the laboratory detection limit; DRO = diesel range organics; FID = flame ionization detector; GC = gas chromatograph; GRO = gasoline range organics; mg/kg = milligrams per kilogram; NA = not available; TPH = total petroleum hydrocarbons

=exceeds Migration to Groundwater Cleanup Levels

=exceeds Migration to Groundwater Cleanup Levels and Residential Soil Cleanup Levels

Bold = detection

¹ Sample SB-3-11 6-8 was analyzed for SVOCs using method 8270C. Detected SVOCs are identified in the table and all other SVOCs were below detection limits (see corresponding laboratory report).

² The TPH cleanup level of 1,000 mg/kg is based on the most stringent cleanup level identified in the Wyoming Oil and Gas Conservation Commission "Guideline for Closure of Unlined Production Pits". If TPH is detected at a level greater than 1,000 mg/kg then the appropriate cleanup level will be determined based on the Oil Contaminated Soil Remediation Ranking System (OCSRRS).

³ Soil cleanup levels are based on the Wyoming Department of Environmental Quality/Solid and Hazardous Waste Division (DEQ/SHWD) cleanup level spreadsheet, effective June 30, 2009.

⁴ A soil cleanup level has not been determined for SAR. Background samples were collected across the Pavillion Natural Gas Field area and will be evaluated.

DRAFT - Table 3-2 - SAR Data Used in Statistical Evaluation, Pavillion Natural Gas Field, Wyoming

Sample	Background Data^{1,2}	Site Data^{1,3}
1	5.1	17
2	0.83	26
3	12	21
4	17	4.2
5	2.7	3.8
6	1	6.5
7	0.53	18
8	1.8	5.6
9	0.68	5.9
10	1.3	3.4
11	3.1	2.9
12	9	7.7
13	2	2.2
14		12
15		12
16		2.6
17		2
18		1.2
19		1.3
20		0.99
21		1
22		1
23		1.9
24		4.7
25		11

¹ Data is reflective of sodium adsorption ratio.

² Background data was collected from locations within the Pavillion Natural Gas Field.

³ Site data was collected from sites WE Lloyd #1, Pavillion Fee 31-9, and Tribal Pavillion 21-9.

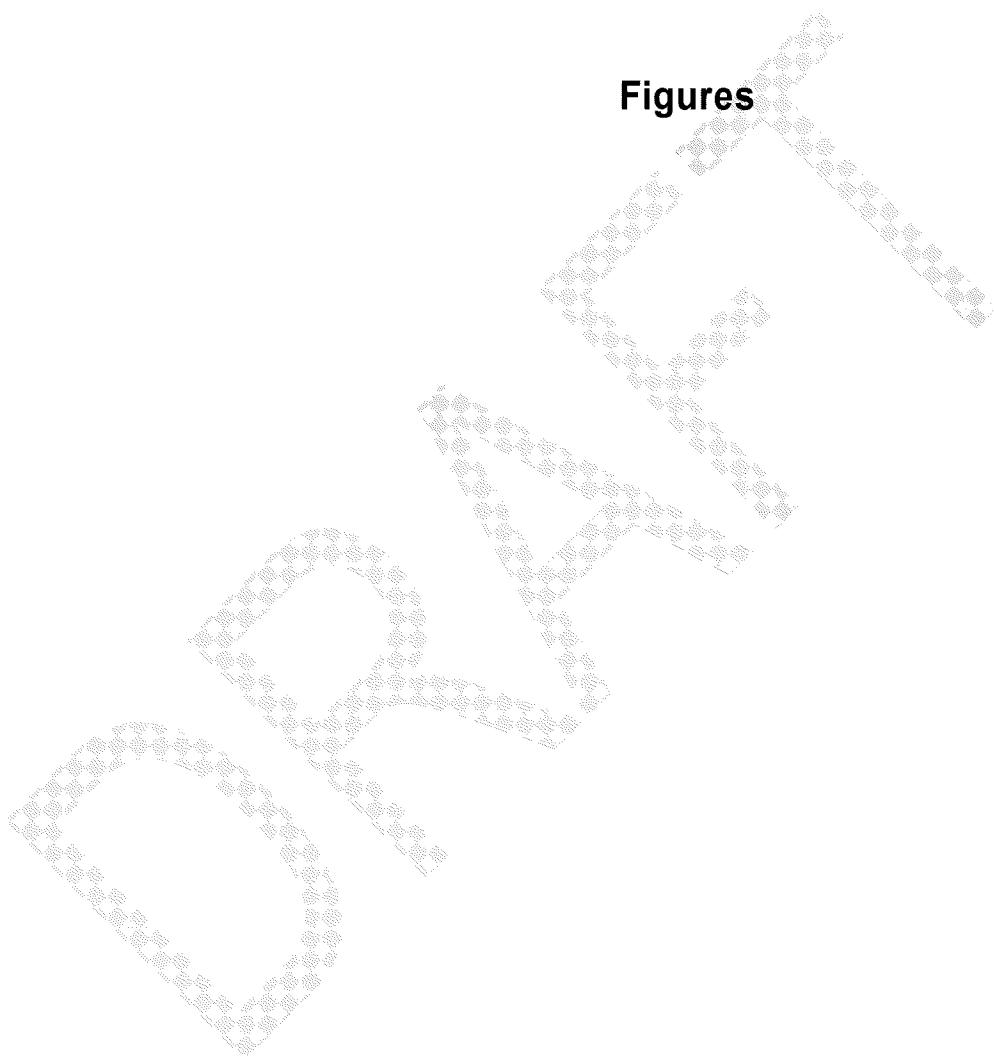
DRAFT - Table 3-3 - Statistical Output of the SAR Evaluation, Pavillion Natural Gas Field, Wyoming

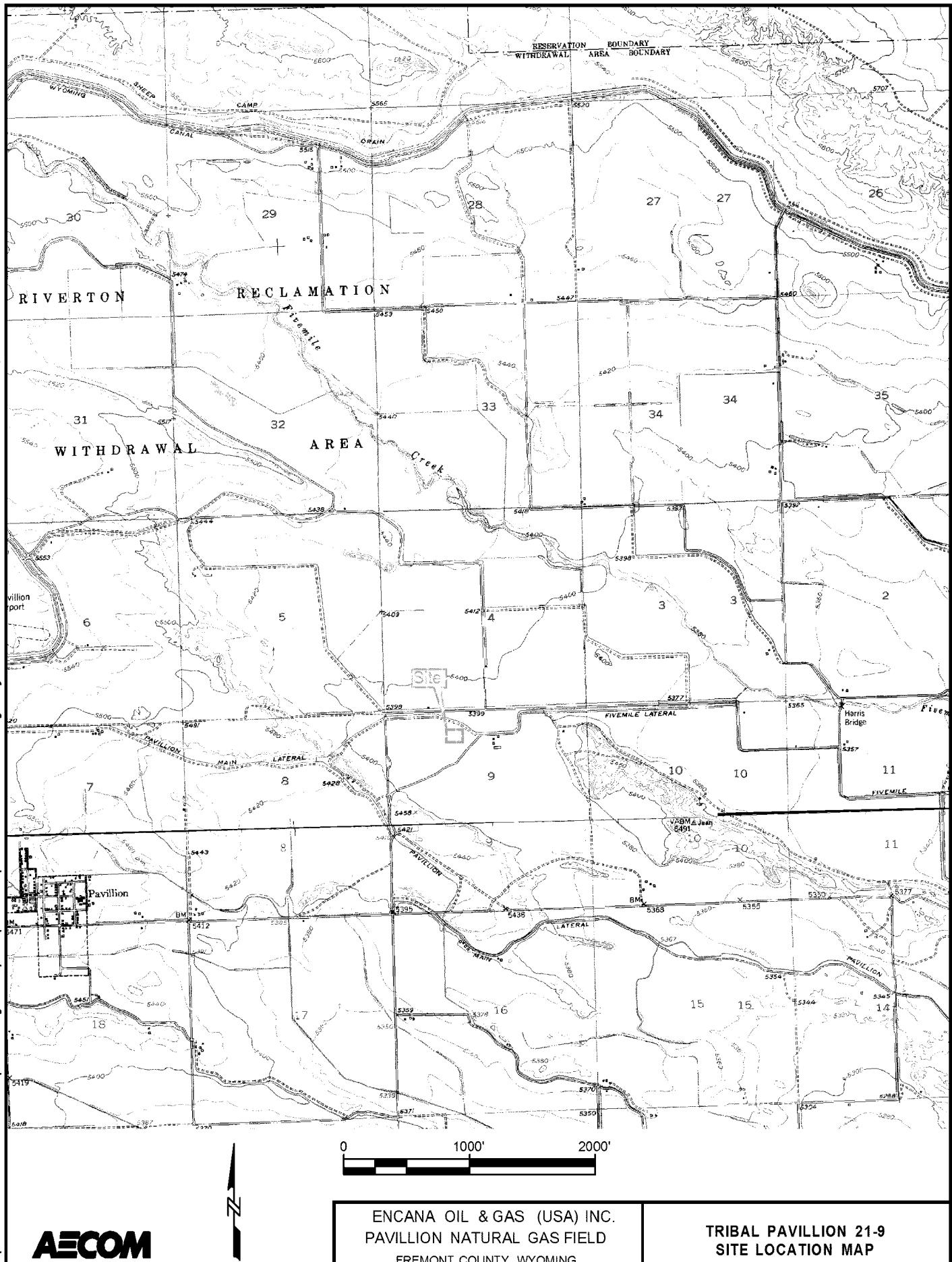
t-Test Site vs Background Comparison for Full Data Sets without NDs			
User Selected Options			
From File	ProUCL-data		
Full Precision	OFF		
Confidence Coefficient	95%		
Substantial Difference (S)	0		
Selected Null Hypothesis	Site or AOC Mean Equal to Background Mean (Two Sided Alternative)		
Alternative Hypothesis	Site or AOC Mean Not Equal to Background Mean		
Area of Concern Data: site			
Background Data: bkgrd			
Raw Statistics			
	Site	Background	
Number of Valid Observations	25	13	
Number of Distinct Observations	23	13	
Minimum	0.99	0.53	
Maximum	26	17	
Mean	70.36	4.388	
Median	4.2	2	
SD	6.978	5.148	
SE of Mean	1.396	1.428	
Site vs Background Two-Sample t-Test			
H0: Mu of Site = Mu of Background			
	t-Test	Critical	
Method	DF	Value	t (0.050)
Pooled (Equal Variance)	36	1.205	2.03
Welch-Satterthwaite (Unequal Variance)	31.5	1.326	2.037
Pooled SD: 7.135			0.236
Conclusion with Alpha = 0.050			0.194
* Student t (Pooled): Do Not Reject H0, Conclude Site = Background			
* Welch-Satterthwaite: Do Not Reject H0, Conclude Site = Background			
Test of Equality of Variances			
Variance of Site	48.69		
Variance of Background	26.5		
Numerator DF	Denominator DF	F-Test Value	P-Value
24	12	1.838	0.273
Conclusion with Alpha = 0.05			
* Two variances appear to be equal			

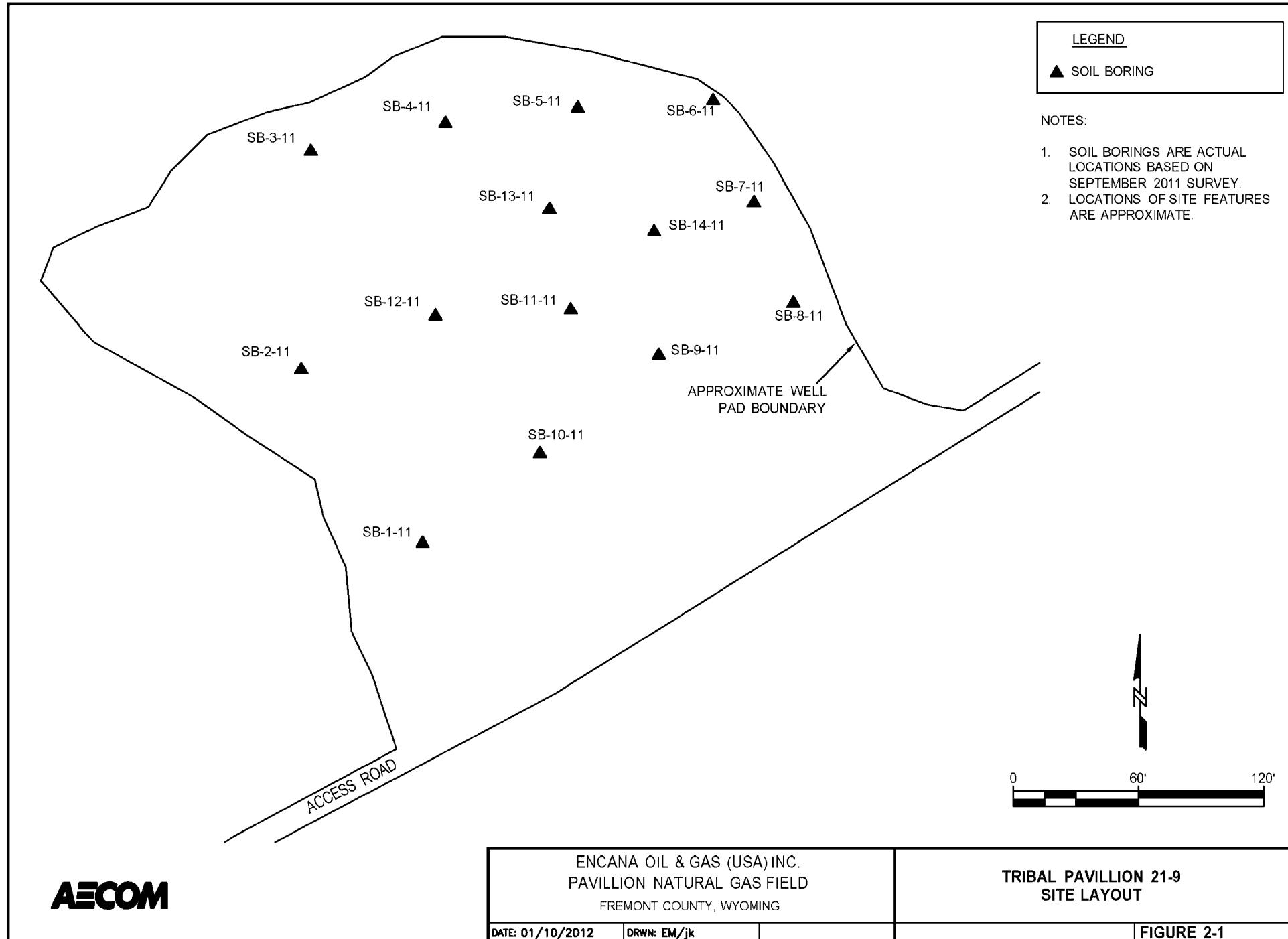
Notes:

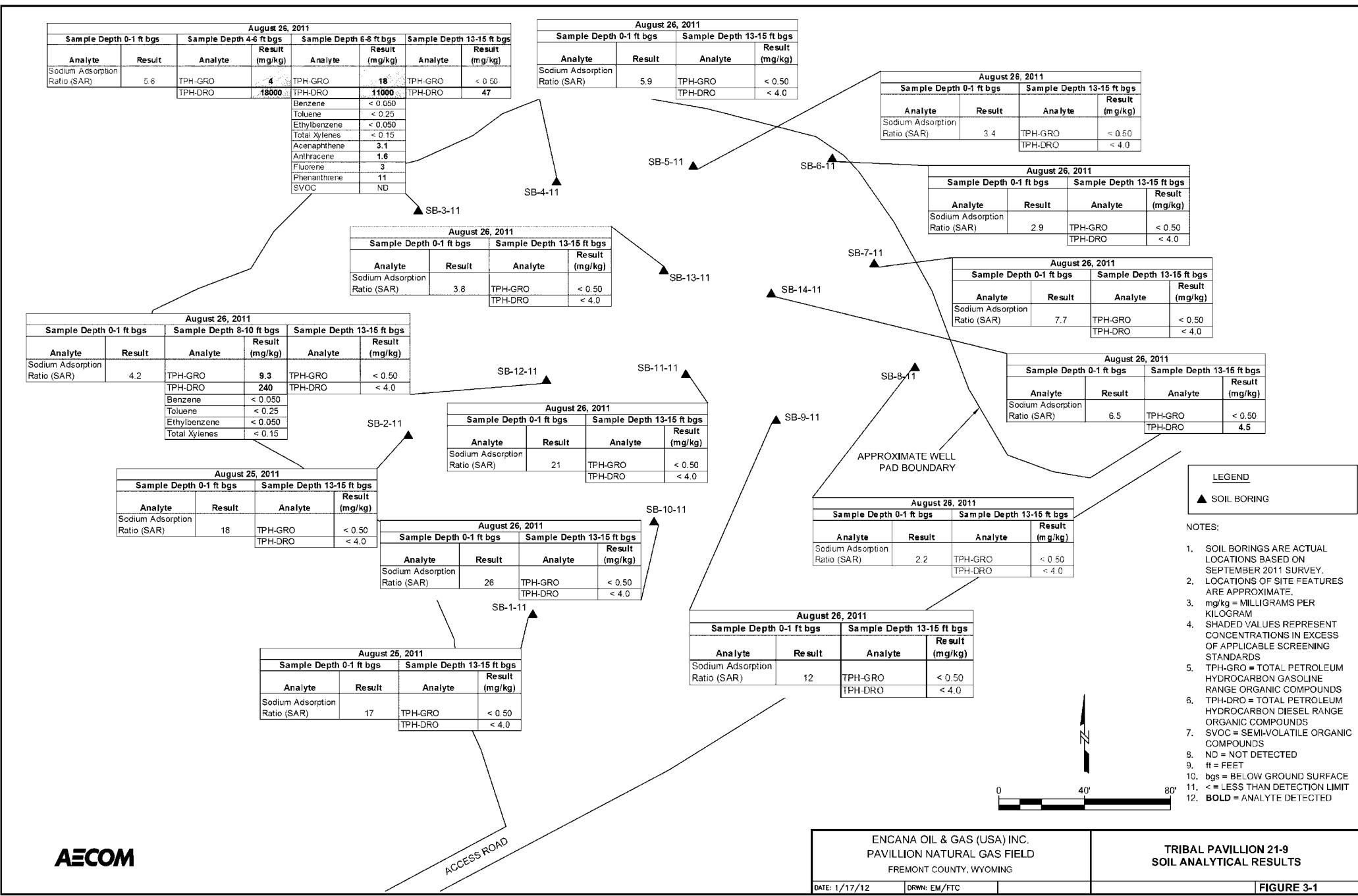
AOC=area of concern; DF=degrees of freedom; H₀=tested null hypothesis; Mu=mean; ND=not detected; P-Value=probability value; SE=standard error

Figures











Appendix A

Soil Boring Logs



		<p><i>Client:</i> Encana Oil & Gas (USA) Inc.</p> <p><i>Project Number:</i> 60221849</p> <p><i>Site Location:</i> Pavillion, WY</p> <p><i>Coordinates:</i> TBD <i>Elevation:</i> TBD</p> <p><i>Drilling Method:</i> Geoprobe Direct Push</p> <p><i>Sample Type(s):</i> Soil <i>Boring Diameter:</i> 2-inch</p>						BORING ID: SB-1-11 (TP-21-9) <i>Sheet:</i> 1 of 1 <i>Monitoring Well Installed:</i> No <i>Screened Interval:</i> NA <i>Depth of Boring:</i> 15 ft <i>Water Level:</i> NA							
<i>Drilling Contractor:</i> Inberg-Miller Engineers		<i>Logged By:</i> C. Ahrendt		<i>Date/Time Started:</i> 8/25/11 15:20		<i>Ground Elevation:</i> TBD		<i>Date/Time Finished:</i> 8/25/11 15:40							
1	DP	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)									
2			95	5.6	SP	Sand with some organics, poorly graded, fine grained, light brownish gray (10YR 6/3), dry									
3				4.4		As above									
4															
5	DP		80	8.2	SM	Silty sand, fine grained, poorly graded, yellowish brown (10YR 5/4), moist									
6				8.1		As above									
7															
8															
9	DP		30	5.1		Silt, stiff, non-plastic, dark yellowish brown (10YR 5/4), moist									
10				N/A		No recovery									
11															
12	DP		60	1.5	ML	As above									
13				0.1											
14															
15						Total Depth = 15 ft									
16															
17															
18															
19															
20															
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips PID background - 0.1 ppm, pid measurements were recorded above background															
NA = not applicable ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface															
Checked by: Chris Ahrendt Date: 1/8/12															

EPAPAV0045708



Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil Boring Diameter: 2-inch Drilling Contractor: Inberg-Miller Engineers Logged By: C. Ahrendt Date/Time Started: 8/25/11 15:44 Ground Elevation: TBD Date/Time Finished: 8/25/11 16:25 Depth of Boring: 15 ft Monitoring Well Installed: No Screened Interval: NA Water Level: NA								BORING ID: SB-2-11 (TP-21-9) Sheet: 1 of 1						
1	DP	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)							
2				80	32.8	SP	Sand with some organic rootlets, poorly graded, fine grained, light brownish gray (10YR 6/2), dry, organic-like odor							
3				80	11.9	ML	As above, slight odor							
4				80	16.8	SM	As above, increasing silt							
5				80	9.5		5.2 ft: Silt, stiff, low plasticity, dark gray (10YR 3/1), moist							
6	DP			80	4.1		6.2 ft: Sand with silt, fine grained, poorly graded, light yellowish brown (10YR 6/4) moist							
7				80	6.9		As above							
8	DP			80	2.9	ML	Silt with trace clay, stiff, non-plastic, dark grayish brown (10YR 3/2), 9.25 ft: Moist with white streak (10YR 8/1)							
9				80			As above							
10				80			Total Depth = 15 ft							
11														
12														
13	DP													
14														
15														
16														
17														
18														
19														
20														
NOTES: Blow count not recorded for Geoprobe ppm – parts per million DP = direct Push, 4 foot acetate sleeve TBD = to be determined Boring abandoned with bentonite chip: ft – feet NA = not applicable bgs = below ground surface														
Checked Chris Ahrendt Date: 1/8/12														



AECOM <i>Geotechnical Engineering</i> <i>Environmental Services</i> <i>Construction Management</i> <i>Project Delivery</i> <i>Transportation</i> <i>Water & Wastewater</i>		Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Sheet: 1 of 1 Drilling Method: Geoprobe Direct Push Monitoring Well Installed: No Sample Type(s): Soil Boring Diameter: 2-inch Screened Interval NA						BORING ID: SB-3-11 (TP-21-9)											
		Coordinates: TBD Elevation: TBD Sheet: 1 of 1 Drilling Method: Geoprobe Direct Push Monitoring Well Installed: No Sample Type(s): Soil Boring Diameter: 2-inch Screened Interval NA																	
		Drilling Contractor: Inberg-Miller Engineers Logged By: C. Ahrendt Date/Time Started: 8/26/11 08:00 Depth of Boring: 15 ft		Ground Elevation: TBD Date/Time Finished: 8/26/11 08:40 Water Level: NA															
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		DP	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							sand with some gravel, poorly graded, fine grained, brown (10YR 5/3), dry												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							silt with fine sand, medium stiff, dark yellowish brown (10YR 5/3), dry/moist												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							silty sand, fine grained, poorly graded, brown (10YR 5/3), moist, slight organic odor												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							silt, stiff, non-plastic, brown (10YR 5/3) with white streaks(10YR8/1), slight odor												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							as above, no odor												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							as above												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							Total Depth = 15 ft												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							(21-9)(SB-3-11)(0-1); (21-9)(SB-3-11)(4-6); (08:45; TPH-GRO & DRO & GRO, and SVOCs												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							(21-9)(3-1)(13-15); (08:55; TPH-GRO & DRO												
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20							13-15												
NOTES: Blow count not recorded for Geoprobe R ppm = parts per million DP= direct Push, 4 foot acetate sleeve TBD = to be determined Boring abandoned with bentonite chips ft = feet NA = not applicable bgs = below ground surface																			
Checked Chris Ahrendt Date: 1/8/12																			



<p><i>Client:</i> Encana Oil & Gas (USA) Inc. <i>Project Number:</i> 60221849 <i>Site Location:</i> Pavillion, WY <i>Coordinates:</i> TBD <i>Elevation:</i> TBD <i>Drilling Method:</i> Geoprobe Direct Push <i>Sample Type(s):</i> Soil <i>Boring Diameter:</i> 2-inch</p>							BORING ID: SB-4-11 (TP-21-9) Sheet: 1 of 1 <i>Monitoring Well Installed:</i> No <i>Screened Interval:</i> NA	
<i>Drilling Contractor</i> Inberg-Miller Engineers			<i>Logged By:</i> C. Ahrendt	<i>Date/Time Started:</i> 8/26/11 08:40		<i>Depth of Boring:</i>	15 ft	
				<i>Ground Elevation:</i> TBD	<i>Date/Time Finished:</i> 8/26/11 09:20	<i>Water Level:</i>	NA	
1	DP	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	
2				80	23	SP	Sand, poorly graded, fine grained, brown (10YR 5/3), dry	
3					5.4		As above, with some silt	
4	DP			80	4.3		Silt with some sand, medium stiff, brown (10YR 4/3), moist	
5					4.3		As above	
6	DP			80	4.3		As above	
7							As above	
8							As above, stiff, dark grayish brown (10YR4/2), moist	
9					4.7		As above	
10	DP			85	4.7	ML	As above	
11					4.6		As above	
12							As above	
13	DP			90	50		Total Depth = 15 ft	
14								
15								
16								
17								
18								
19								
20								
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips NA = not applicable								
Checked by: Chris Ahrendt Date: 1/8/12				ppm = parts per million	TBD = to be determined	ft = feet	bgs = below ground surface	
				(21.9)(SB-4-11)(13.5") 09:20; TPH-GRO & DRO	(21.9)(SB-4-11)(0-1") 09:15; SAR			13-15

		Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil Boring Diameter: 2-inch					BORING ID: SB-5-11 (TP-21-9)			
Sheet: 1 of 1					Monitoring Well Installed: No					
Screened Interval: NA										
Drilling Contractor: Inberg-Miller Engineers Logged By: C. Ahrendt Date/Time Started: 8/26/11 09:25 Depth of Boring: 15 ft										
Ground Elevation: TBD Date/Time Finished: 8/26/11 09:50 Water Level: NA										
<p style="text-align: center;">MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)</p>										
1	DP	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	Sand, poorly graded, fine grained, grayish brown (10YR 5/2). dry	(21-9)(SB-5-1)(0-1); 09-45; SAR	0-1		
2			80	2.3		As above				
3				3.0						
4										
5	DP									
6										
7										
8										
9										
10	DP									
11										
12										
13										
14	DP									
15										
16						Total Depth = 15 ft				
17										
18										
19										
20										
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips NA = not applicable										
ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface										
Checked by: Chris Ahrendt			Date: 1/8/12							

EPAPAV0045712



		Client: Encana Oil & Gas (USA) Inc.					BORING ID: SB-6-11 (TP-21-9)								
		Project Number: 60221849													
		Site Location: Pavillion, WY			Coordinates: TBD Elevation: TBD			Sheet: 1 of 1							
		Drilling Method: Geoprobe Direct Push			Monitoring Well Installed: No										
		Sample Type(s): Soil			Boring Diameter: 2-inch			Screened Interval: NA							
Drilling Contractor: Inberg-Miller Engineers			Logged By: C. Ahrendt		Date/Time Started: 8/26/11 10:00		Depth of Boring: 15 ft								
			Ground Elevation: TBD		Date/Time Finished: 8/26/11 10:20		Water Level: NA								
Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)									
1	DP		80	4.4 5.8 7.5 6.2	SM ML	Silty sand, poorly graded, fine grained, light gray (10YR 7/2), dry									
2						As above									
3						Sandy silt, medium stiff, non-plastic, light gray (10YR 7/2), dry									
4						As above									
5	DP		85	5.7 3.2 3.5 3.8		As above									
6						Silt, stiff, non-plastic, brown (10YR 5/3) and white streaks (10YR 8/1), moist									
7						As above									
8						As above									
9	DP		80	3.2 3.5 3.8		Total Depth = 15 ft									
10															
11															
12															
13	DP		100												
14															
15															
16															
17															
18															
19															
20															
NOTES: Blow count not recorded for Geoprobe ppm = parts per million DP= direct Push, 4 foot acetate sleeve TBD = to be determined Boring abandoned with bentonite chip ft = feet NA = not applicable bgs = below ground surface															
Checked Chris Ahrendt Date: 1/8/12															

EPAPAV0045713

AECOM		Client: Encana Oil & Gas (USA) Inc.						BORING ID: SB-7-11 (TP-21-9)						
		Project Number: 60221849												
		Site Location: Pavillion, WY												
		Coordinates: TBD			Elevation: TBD		Sheet: 1 of 1							
		Drilling Method: Geoprobe Direct Push						Monitoring Well Installed: No						
Sample Type(s): Soil		Boring Diameter: 2-inch						Screened Interval NA						
Drilling Contractor: Inberg-Miller Engineers				Logged By: C. Ahrendt		Date/Time Started: 8/26/11 10:25		Depth of Boring: 15 ft						
				Ground Elevation: TBD		Date/Time Finished: 8/26/11 11:00		Water Level: NA						
1	DP	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)							
2				80	5.0		Sand, poorly graded, fine grained, light brownish gray (10YR 6/2), dry							
3					6.7		As above							
4														
5	DP			80	6.0		As above							
6														
7							As above, increasing silt							
8														
9	DP			85	6.3		As above							
10														
11							Silt, medium stiff, non-plastic, brown (10YR 4/3) with white streaks (10YR 8/1)							
12	DP			85	6.7		As above							
13														
14							ML							
15	DP			15	2.4									
16							Total Depth = 15 ft							
17														
18														
19														
20														
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips PID = 0.1 ppm, PID measurements were recorded above background														
NA = not applicable ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface														
Checked by: Chris Ahrendt					Date: 1/8/12									

EPAPAV0045714



NOTES.

NOTES:
Blow count not recorded for Geoprobe Rig

DP = direct Push, 4 foot acetate sleeve

DP= direct Push. 4 foot acetate sleeve
Boring abandoned with bentonite chips

NA = not applicable

ppm = parts per million

TBD = to be determined

ft = feet

bgs = below ground surface

Checked by: Chris Ahrendt

Date: 1/8/12

EPAPAV0045715



<p><i>Client:</i> Encana Oil & Gas (USA) Inc. <i>Project Number:</i> 60221849 <i>Site Location:</i> Pavillion, WY <i>Coordinates:</i> TBD <i>Elevation:</i> TBD <i>Drilling Method:</i> Geoprobe Direct Push <i>Sample Type(s):</i> Soil <i>Boring Diameter:</i> 2-inch</p>							BORING ID: SB-9-11 (TP-21-9) Sheet: 1 of 1 Monitoring Well Installed: No Screened Interval: NA									
<i>Drilling Contractor:</i> Inberg-Miller Engineers		<i>Logged By:</i> C. Ahrendt		<i>Date/Time Started:</i> 8/26/11 11:40		<i>Depth of Boring:</i> 15 ft										
		<i>Ground Elevation:</i> TBD		<i>Date/Time Finished:</i> 8/26/11 12:05		<i>Water Level:</i> NA										
1	DP	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)									
2				85	5.3		Sand, poorly graded, fine grained, brown (10YR 7/3), moist									
3					6.1		As above, pale brown (10YR 6/3)									
4							As above									
5							As above									
6	DP			85	6.9		As above									
7					6.0		As above									
8							As above									
9							As above									
10	DP			85	3.5		Silt, medium stiff, non-plastic, dark yellowish brown (10YR 4/6) with white streaks (10YR 8/1), moist									
11					4.8		As above									
12							As above									
13	DP			60	5.4		As above									
14					4.5											
15							Total Depth = 15 ft									
16																
17																
18																
19																
20																
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips NA = not applicable																
Checked by: Chris Ahrendt			Date: 1/8/12													
ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface																
(21-9)(SB-9-11)(13-15); 12:05; TPH-GRO & DRC																
Lab Sample ID Lab Sample Depth (ft)																
0-1																
13-15																



Project Information						Boring ID:			
Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil Boring Diameter: 2-inch						SB-10-11 (TP-21-9)			
						Sheet: 1 of 1 Monitoring Well Installed: No			
Drilling Contractor: Inberg-Miller Engineers			Logged By: C. Ahrendt Date/Time Started: 8/25/11 14:15		Depth of Boring: 20 ft				
			Ground Elevation: TBD Date/Time Finished: 8/25/11 15:10		Water Level: NA				
Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)		Lab Sample ID	Lab Sample Depth (ft)
1	DP	75	5.8	5.6	SP	Sand, poorly graded, fine grained, pale brown (10YR 6/3), dry / moist		(21.9)(SB-10-1)(0-1); 15:00; SAR	0-1
2						As above			
3	DP	75	3.2	3.8	SP	As above			
4						As above			
5	DP	75	1.8	2.3	ML	As above			
6						8.1 ft - Silt, medium stiff, non-plastic, dark grayish brown (10YR 4/2) and white (10YR 8/1) streaks, moist			
7	DP	80	2.3	2.5	ML	As above			
8						As above			
9	DP	45	N/A	2.5	ML	As above			
10						As above			
11	DP	80	2.3	3.3	ML	As above			
12						As above, soft, very moist to saturated			
13									
14									
15									
16									
17									
18									
19									
20						Total Depth = 20 ft			

NOTES:
Blow count not recorded for Geoprobe Rig
DP= direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips
NA = not applicable

ppm = parts per million
TBD = to be determined
ft = feet
bgs = below ground surface

NOTES:-

Blow count not recorded for Geoprobe Rig

DP = direct Push, 4 foot acetate sleeve

DF= direct Flush, 4 foot acetate sleeve
Boring abandoned with bentonite chips

NA = not applicable

ppm = parts per million

TBD = to be determined

ft = feet

bgs = below ground surface

Checked by: Chris Ahrendt

Date: 1/8/12

EPAPAV0045717

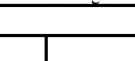
		Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil					BORING ID: SB-11-11 (TP-21-9) Sheet: 1 of 1					
Drilling Contractor: Inberg-Miller Engineers		Logged By: C. Ahrendt		Date/Time Started: 8/26/11 12:10		Depth of Boring: 15 ft						
		Ground Elevation: TBD		Date/Time Finished: 8/26/11 12:40		Water Level: NA						
		MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)										
1	DP	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	Sand, poorly graded, fine grained, light brownish gray (10YR 6/2), moist			0-1			
2			80	4.7	SP	As above						
3			3.4			As above						
4	DP		80	8.2	CL	As above with silt						
5			3.4			Clay with silt, medium stiff, medium plasticity, grayish brown (10YR5/2), moist						
6	DP		30	4.3	CL	No recovery						
7			N/A									
8	DP		100	5.2								
9						Total Depth = 15 ft						
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips NA = not applicable												
ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface												
Checked by: Chris Ahrendt					Date: 1/8/12							

EPAPAV0045718

		Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil					BORING ID: SB-12-11 (TP-21-9) Sheet: 1 of 1																																																																																																																																																																																														
Monitoring Well Installed: No					Screened Interval NA																																																																																																																																																																																																
Sample Type(s): Soil					Boring Diameter: 2-inch																																																																																																																																																																																																
Drilling Contractor: Inberg-Miller Engineers			Logged By: C. Ahrendt		Date/Time Started: 8/26/11 13:15		Depth of Boring: 15 ft																																																																																																																																																																																														
			Ground Elevation: TBD		Date/Time Finished: 8/26/11 13:35		Water Level: NA																																																																																																																																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Depth (ft)</th> <th style="text-align: center;">Sample Type</th> <th style="text-align: center;">Blows per 6"</th> <th style="text-align: center;">Recovery (%)</th> <th style="text-align: center;">Headspace (ppm)</th> <th style="text-align: center;">U.S.C.S</th> <th colspan="3" style="text-align: center;">MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">DP</td> <td></td> <td></td> <td style="text-align: center;">4.1</td> <td style="text-align: center;">SP</td> <td colspan="3">Sand, poorly graded, fine grained, light gray (10YR 7/2), dry</td> </tr> <tr> <td style="text-align: center;">2</td> <td></td> <td></td> <td style="text-align: center;">80</td> <td style="text-align: center;">4.2</td> <td style="text-align: center;">As above</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">3</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">As above</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">4</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">Silt, soft, non-plastic, brown(10YR 5/3), moist</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">DP</td> <td></td> <td style="text-align: center;">45</td> <td style="text-align: center;">5.4</td> <td style="text-align: center;">ML</td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">6</td> <td></td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">DP</td> <td></td> <td style="text-align: center;">100</td> <td style="text-align: center;">166</td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">11</td> <td></td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">12</td> <td></td> <td></td> <td></td> <td style="text-align: center;">N/A</td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">13</td> <td style="text-align: center;">DP</td> <td></td> <td style="text-align: center;">100</td> <td style="text-align: center;">41</td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">14</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3"></td> </tr> <tr> <td style="text-align: center;">15</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="3" style="text-align: center;">Total Depth = 15 ft</td> </tr> <tr> <td style="text-align: center;">16</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">17</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">18</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">20</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)			1	DP			4.1	SP	Sand, poorly graded, fine grained, light gray (10YR 7/2), dry			2			80	4.2	As above				3					As above				4					Silt, soft, non-plastic, brown(10YR 5/3), moist				5	DP		45	5.4	ML				6				N/A					7									8									9									10	DP		100	166					11				N/A					12				N/A					13	DP		100	41					14									15						Total Depth = 15 ft			16									17									18									19									20																
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<p>NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips PID background = 0.3 ppm. PID measurements were recorded above background DUP-1 collected at (21-9)(SB-12-11)(8-10') Checked by: Chris Ahrendt Date: 1/8/12 </p> <p>NA = not applicable ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface</p>																																																																																																																																																																																																					

EPAPAV0045719



Project Information							Boring Details			
 <p>AECOM</p>		Client: Encana Oil & Gas (USA) Inc.			BORING ID: SB-13-11 (TP-21-9)					
		Project Number: 60221849								
		Site Location: Pavillion, WY								
		Coordinates: TBD			Elevation: TBD		Sheet: 1 of 1			
		Drilling Method: Geoprobe Direct Push			Monitoring Well Installed: No					
Sample Type(s): Soil				Boring Diameter: 2-inch		Screened Interval NA				
Drilling Contractor: Inberg-Miller Engineers			Logged By: C. Ahrendt		Date/Time Started: 8/26/11 13:40		Depth of Boring: 15 ft			
			Ground Elevation: TBD		Date/Time Finished: 8/26/11 13:55		Water Level: NA			
MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)										
1	DP	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S.	Sand with gravel and organic rootlets, vary pale brown (10YR 7/3), dry				
2			60	6.0	SP	As above				
3				6.9		As above				
4	DP				ML	Silt, soft, non-plastic, pale brown (10YR 4/3), dry				
5			30	5.9		as above				
6	DP			N/A		as above				
7					CL					
8										
9										
10	DP				CL					
11										
12										
13	DP				CL	Clay, medium stiff, medium plasticity, brown (10YR 4/3), moist				
14										
15			20	6.8						
16						Total Depth = 15 ft				
17										
18										
19										
20										
NOTES: Blow count not recorded for Geoprobe Rig DP= direct Push, 4 foot acetate sleeve Boring abandoned with bentonite chips NA = not applicable										
ppm = parts per million TBD = to be determined ft = feet bgs = below ground surface										
Checked by: Chris Ahrendt			Date: 1/8/12							

NOTES.

Blow count not recorded for Geoprobe Rig

DP= direct Push, 4 foot acetate sleeve

BP - direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips

NA = not applicable

ppm = parts per million

TBD = to be determined

ft = feet

bgs = below ground surface

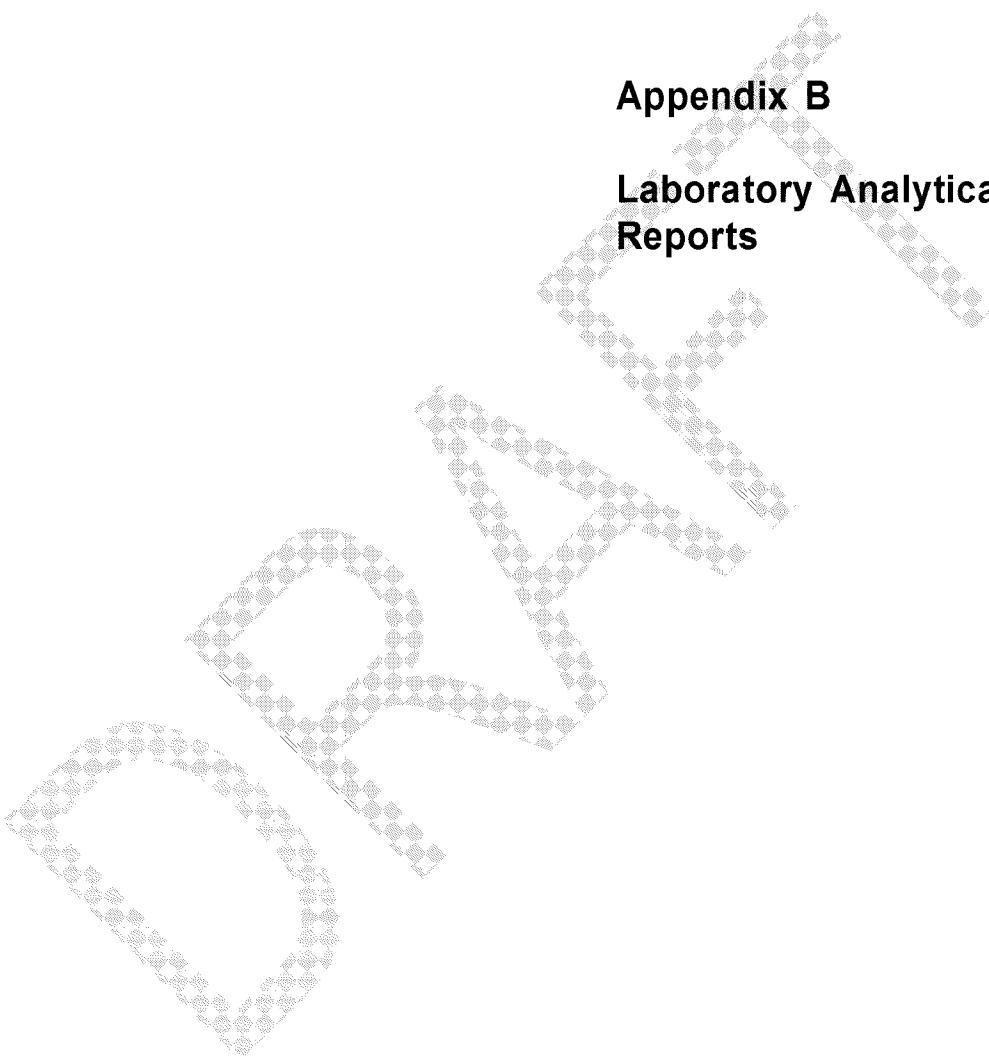
Checked by: Chris Ahrendt

Date: 1/8/12

EPAPAV0045720

		Client: Encana Oil & Gas (USA) Inc. Project Number: 60221849 Site Location: Pavillion, WY Coordinates: TBD Elevation: TBD Drilling Method: Geoprobe Direct Push Sample Type(s): Soil					BORING ID: SB-14-11 (TP-21-9)																																																																																																							
Sheet: 1 of 1					Monitoring Well Installed: No																																																																																																									
Boring Diameter: 2-inch					Screened Interval: NA																																																																																																									
Drilling Contractor: Inberg-Miller Engineers		Logged By: C. Ahrendt		Date/Time Started: 08/26/11 14:00		Depth of Boring: 15 ft																																																																																																								
		Ground Elevation: TBD		Date/Time Finished: 08/26/11 14:20		Water Level: NA																																																																																																								
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Checked by: Chris Ahrendt			Date: 1/8/12																																																																																																											

EPAPAV0045721



Appendix B

Laboratory Analytical Reports



12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859
Tax I.D. 62-0814289
Est. 1970

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Report Summary

Thursday September 08, 2011

Report Number: L533490

Samples Received: 08/30/11

Client Project: 601 969 41

Description: Encana Tribal Pavillion VRP-Fremont Co. WY

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Leslie Newton
Leslie Newton, ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana Tribal Pavillion VRP-Fremont Co. WY
Sample ID : 21-9 SB-1-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/25/11 15:35

ESC Sample # : L533490-01

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	17.				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-02
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-1-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/25/11 15:40

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	107.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	46.1		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L533490-03

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-2-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/25/11 16:15

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	18.				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-04
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-2-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/25/11 16:20

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	107.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	50.8		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-3-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 08:40

ESC Sample # : L533490-05
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	5.6				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-06
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-3-11 4-6 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 08:45

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	4.0	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	108.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	18000	400	mg/kg	8015	09/07/11	100
Surrogate recovery(%) o-Terphenyl	0.00		% Rec.	8015	09/07/11	100

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Mr. Dustin Krajewski
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1601 Prospect Parkway
Fort Collins, CO 80525

September 08, 2011

Date Received :	August 30, 2011	ESC Sample # :	L533490-07
Description :	Encana-Pavillion, WY	Site ID :	21-9
Sample ID :	21-9 SB-3-11 6-8 FT	Project # :	601 969 41
Collected By :	Chris Ahrendt		
Collection Date :	08/26/11 08:50		

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	18.	5.0	mg/kg	GRO	09/01/11	50
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	100.		% Rec.	GRO	09/01/11	50
Benzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Toluene	BDL	0.25	mg/kg	8260B	08/31/11	50
Ethylbenzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Total Xylenes	BDL	0.15	mg/kg	8260B	08/31/11	50
Surrogate Recovery						
Toluene-d8	108.		% Rec.	8260B	08/31/11	50
Dibromofluoromethane	100.		% Rec.	8260B	08/31/11	50
a,a,a-Trifluorotoluene	103.		% Rec.	8260B	08/31/11	50
4-Bromofluorobenzene	130.		% Rec.	8260B	08/31/11	50
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	11000	400	mg/kg	8015	09/07/11	100
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	8015	09/07/11	100
Base/Neutral Extractables						
Acenaphthene	3.1	1.6	mg/kg	8270C	09/05/11	50
Acenaphthylene	BDL	1.6	mg/kg	8270C	09/05/11	50
Anthracene	1.6	1.6	mg/kg	8270C	09/05/11	50
Benzidine	BDL	17.	mg/kg	8270C	09/05/11	50
Benzo(a)anthracene	BDL	1.6	mg/kg	8270C	09/05/11	50
Benzo(b)fluoranthene	BDL	1.6	mg/kg	8270C	09/05/11	50
Benzo(k)fluoranthene	BDL	1.6	mg/kg	8270C	09/05/11	50
Benzo(g,h,i)perylene	BDL	1.6	mg/kg	8270C	09/05/11	50
Benzo(a)pyrene	BDL	1.6	mg/kg	8270C	09/05/11	50
Bis(2-chlorethoxy)methane	BDL	17.	mg/kg	8270C	09/05/11	50
Bis(2-chloroethyl)ether	BDL	17.	mg/kg	8270C	09/05/11	50
Bis(2-chloroisopropyl)ether	BDL	17.	mg/kg	8270C	09/05/11	50
4-Bromophenyl-phenylether	BDL	17.	mg/kg	8270C	09/05/11	50
2-Chloronaphthalene	BDL	1.6	mg/kg	8270C	09/05/11	50
4-Chlorophenyl-phenylether	BDL	17.	mg/kg	8270C	09/05/11	50
Chrysene	BDL	1.6	mg/kg	8270C	09/05/11	50
Dibenz(a,h)anthracene	BDL	1.6	mg/kg	8270C	09/05/11	50
3,3-Dichlorobenzidine	BDL	17.	mg/kg	8270C	09/05/11	50
2,4-Dinitrotoluene	BDL	17.	mg/kg	8270C	09/05/11	50
2,6-Dinitrotoluene	BDL	17.	mg/kg	8270C	09/05/11	50
Fluoranthene	BDL	1.6	mg/kg	8270C	09/05/11	50
Fluorene	3.0	1.6	mg/kg	8270C	09/05/11	50
Hexachlorobenzene	BDL	17.	mg/kg	8270C	09/05/11	50
Hexachloro-1,3-butadiene	BDL	17.	mg/kg	8270C	09/05/11	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

L533490-07 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.

L533490-07 (SV8270BNA) - Dilution due to matrix



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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-3-11 6-8 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 08:50

ESC Sample # : L533490-07
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Hexachlorocyclopentadiene	BDL	17.	mg/kg	8270C	09/05/11	50
Hexachloroethane	BDL	17.	mg/kg	8270C	09/05/11	50
Indeno(1,2,3-cd)pyrene	BDL	1.6	mg/kg	8270C	09/05/11	50
Isophorone	BDL	17.	mg/kg	8270C	09/05/11	50
Naphthalene	BDL	1.6	mg/kg	8270C	09/05/11	50
Nitrobenzene	BDL	17.	mg/kg	8270C	09/05/11	50
n-Nitrosodimethylamine	BDL	17.	mg/kg	8270C	09/05/11	50
n-Nitrosodiphenylamine	BDL	17.	mg/kg	8270C	09/05/11	50
n-Nitrosodi-n-propylamine	BDL	17.	mg/kg	8270C	09/05/11	50
Phenanthrene	11.	1.6	mg/kg	8270C	09/05/11	50
Benzylbutyl phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Bis(2-ethylhexyl)phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Di-n-butyl phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Diethyl phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Dimethyl phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Di-n-octyl phthalate	BDL	17.	mg/kg	8270C	09/05/11	50
Pyrene	BDL	1.6	mg/kg	8270C	09/05/11	50
1,2,4-Trichlorobenzene	BDL	17.	mg/kg	8270C	09/05/11	50
Acid Extractables						
4-Chloro-3-methylphenol	BDL	17.	mg/kg	8270C	09/05/11	50
2-Chlorophenol	BDL	17.	mg/kg	8270C	09/05/11	50
2,4-Dichlorophenol	BDL	17.	mg/kg	8270C	09/05/11	50
2,4-Dimethylphenol	BDL	17.	mg/kg	8270C	09/05/11	50
4,6-Dinitro-2-methylphenol	BDL	17.	mg/kg	8270C	09/05/11	50
2,4-Dinitrophenol	BDL	17.	mg/kg	8270C	09/05/11	50
2-Nitrophenol	BDL	17.	mg/kg	8270C	09/05/11	50
4-Nitrophenol	BDL	17.	mg/kg	8270C	09/05/11	50
Pentachlorophenol	BDL	17.	mg/kg	8270C	09/05/11	50
Phenol	BDL	17.	mg/kg	8270C	09/05/11	50
2,4,6-Trichlorophenol	BDL	17.	mg/kg	8270C	09/05/11	50
Surrogate Recovery						
2-Fluorophenol	0.00	% Rec.	8270C	09/05/11	50	
Phenol-d5	0.00	% Rec.	8270C	09/05/11	50	
Nitrobenzene-d5	0.00	% Rec.	8270C	09/05/11	50	
2-Fluorobiphenyl	0.00	% Rec.	8270C	09/05/11	50	
2,4,6-Tribromophenol	0.00	% Rec.	8270C	09/05/11	50	
p-Terphenyl-d14	0.00	% Rec.	8270C	09/05/11	50	

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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L533490-07 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.

L533490-07 (SV8270BNA) - Dilution due to matrix



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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-08
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-3-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 08:55

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	106.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	47.	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	57.6		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-4-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 09:15

ESC Sample # : L533490-09
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	5.9				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-10
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-4-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 09:20

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	107.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	66.1		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-5-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 09:40

ESC Sample # : L533490-11
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	3.4				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
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Date Received : August 30, 2011 ESC Sample # : L533490-12
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-5-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 09:45

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	106.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	65.1		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-6-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 10:10

ESC Sample # : L533490-13

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	2.9				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-14
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-6-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 10:15

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	106.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	74.2		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-7-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 10:50

ESC Sample # : L533490-15
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	7.7				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-16
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-7-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 10:55

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	106.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	55.8		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-8-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 11:20

ESC Sample # : L533490-17
Site ID : 21-9
Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	2.2				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-18
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-8-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 11:25

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	107.		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	70.5		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-9-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 12:00

ESC Sample # : L533490-19

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	12.				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 08, 2011

Date Received : August 30, 2011 ESC Sample # : L533490-20
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-9-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 12:05

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	96.8		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/08/11	1
Surrogate recovery(%) o-Terphenyl	59.8		% Rec.	8015	09/08/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Fort Collins, CO 80525

ESC Sample # : L533490-21

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-10-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 15:00

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	26.				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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Mr. Dustin Krajewski
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1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-22
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-10-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 15:05

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	97.6		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	72.2		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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ESC Sample # : L533490-23

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-11-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 12:25

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	21.				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-24
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-11-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 12:30

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	08/31/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	96.7		% Rec.	GRO	08/31/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/03/11	1
Surrogate recovery(%) o-Terphenyl	75.6		% Rec.	8015	09/03/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

September 08, 2011

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Fort Collins, CO 80525

ESC Sample # : L533490-25

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-12-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 13:20

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	4.2				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-26
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-12-11 8-10 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 13:25

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	9.3	5.0	mg/kg	GRO	09/01/11	50
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	92.8		% Rec.	GRO	09/01/11	50
Benzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Toluene	BDL	0.25	mg/kg	8260B	08/31/11	50
Ethylbenzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Total Xylenes	BDL	0.15	mg/kg	8260B	08/31/11	50
Surrogate Recovery						
Toluene-d8	108.		% Rec.	8260B	08/31/11	50
Dibromofluoromethane	91.3		% Rec.	8260B	08/31/11	50
a,a,a-Trifluorotoluene	101.		% Rec.	8260B	08/31/11	50
4-Bromofluorobenzene	117.		% Rec.	8260B	08/31/11	50
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	240	20.	mg/kg	8015	09/07/11	5
Surrogate recovery(%) o-Terphenyl	65.5		% Rec.	8015	09/07/11	5

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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L533490-26 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.



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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-27
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-12-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 13:30

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/01/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	93.4		% Rec.	GRO	09/01/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/06/11	1
Surrogate recovery(%) o-Terphenyl	88.3		% Rec.	8015	09/06/11	1

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September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-28
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 DUP-1 Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 00:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	26.	25.	mg/kg	GRO	08/31/11	250
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	98.3		% Rec.	GRO	08/31/11	250
Benzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Toluene	BDL	0.25	mg/kg	8260B	08/31/11	50
Ethylbenzene	BDL	0.050	mg/kg	8260B	08/31/11	50
Total Xylenes	BDL	0.15	mg/kg	8260B	08/31/11	50
Surrogate Recovery						
Toluene-d8	107.		% Rec.	8260B	08/31/11	50
Dibromofluoromethane	92.0		% Rec.	8260B	08/31/11	50
a,a,a-Trifluorotoluene	101.		% Rec.	8260B	08/31/11	50
4-Bromofluorobenzene	134.		% Rec.	8260B	08/31/11	50
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	220	20.	mg/kg	8015	09/07/11	5
Surrogate recovery(%) o-Terphenyl	56.7		% Rec.	8015	09/07/11	5

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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L533490-28 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.



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REPORT OF ANALYSIS

September 08, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L533490-29

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-13-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 13:45

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	3.8				Calc.	08/31/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-30
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-13-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 13:50

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/01/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	92.3		% Rec.	GRO	09/01/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/06/11	1
Surrogate recovery(%) o-Terphenyl	83.1		% Rec.	8015	09/06/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : 21-9 SB-14-11 0-1 FT
Collected By : Chris Ahrendt
Collection Date : 08/26/11 14:10

ESC Sample # : L533490-31

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	6.5				Calc.	08/31/11	1

BDL - Below Detection Limit
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September 08, 2011

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AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : August 30, 2011 ESC Sample # : L533490-32
Description : Encana-Pavillion, WY Site ID : 21-9
Sample ID : 21-9 SB-14-11 13-15 FT Project # : 601 969 41
Collected By : Chris Ahrendt
Collection Date : 08/26/11 14:15

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/01/11	5
Surrogate Recovery-% a,a,a-Trifluorotoluene(FID)	93.2		% Rec.	GRO	09/01/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	4.5	4.0	mg/kg	8015	09/06/11	1
Surrogate recovery(%) o-Terphenyl	92.8		% Rec.	8015	09/06/11	1

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AECOM Inc. - Fort Collins, CO
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Fort Collins, CO 80525

Date Received : August 30, 2011
Description : Encana-Pavillion, WY
Sample ID : TRIPBLANK
Collected By : Chris Ahrendt
Collection Date : 08/25/11 08:00

ESC Sample # : L533490-33

Site ID : 21-9

Project # : 601 969 41

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0010	mg/l	8260B	08/31/11	1
Toluene	BDL	0.0050	mg/l	8260B	08/31/11	1
Ethylbenzene	BDL	0.0010	mg/l	8260B	08/31/11	1
Total Xylenes	BDL	0.0030	mg/l	8260B	08/31/11	1
Surrogate Recovery						
Toluene-d8	98.6		% Rec.	8260B	08/31/11	1
Dibromofluoromethane	99.1		% Rec.	8260B	08/31/11	1
a,a,a-Trifluorotoluene	105.		% Rec.	8260B	08/31/11	1
4-Bromofluorobenzene	99.8		% Rec.	8260B	08/31/11	1

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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L533490-02	WG553224	SAMP	TPH (GC/FID) High Fraction	R1844512	J6
	WG553224	SAMP	o-Terphenyl	R1844512	J2
L533490-06	WG553224	SAMP	o-Terphenyl	R1844512	J7
L533490-07	WG553395	SAMP	2-Fluorophenol	R1845212	J7
	WG553395	SAMP	Phenol-d5	R1845212	J7
	WG553395	SAMP	Nitrobenzene-d5	R1845212	J7
	WG553395	SAMP	2-Fluorobiphenyl	R1845212	J7
	WG553395	SAMP	2,4,6-Tribromophenol	R1845212	J7
	WG553395	SAMP	p-Terphenyl-d14	R1845212	J7
	WG553224	SAMP	o-Terphenyl	R1844512	J7

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
J7	Surrogate recovery limits cannot be evaluated; surrogates were diluted out

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
09/08/11 at 16:17:10

TSR Signing Reports: 044
R5 - Desired TAT

Always run BTEX by 8260 unless noted otherwise. ln 9/2/11



L A B S C I E N C E S

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Est. 1970

Quality Assurance Report
Level II

L533490

September 08, 2011

Analyte	Result	Laboratory Blank Units	% Rec.	Limit	Batch	Date Analyzed
TPH (GC/FID) Low Fraction a,a,a-Trifluorotoluene(FID)	<.1	mg/kg % Rec.	98.24	59-128	WG553023	08/31/11 06:39
Benzene	<.001	mg/l			WG553000	08/30/11 23:44
Ethylbenzene	<.001	mg/l			WG553000	08/30/11 23:44
Toluene	<.005	mg/l			WG553000	08/30/11 23:44
Total Xylenes	<.003	mg/l			WG553000	08/30/11 23:44
4-Bromofluorobenzene		% Rec.	103.9	75-128	WG553000	08/30/11 23:44
Dibromofluoromethane		% Rec.	93.77	79-125	WG553000	08/30/11 23:44
Toluene-d8		% Rec.	101.2	87-114	WG553000	08/30/11 23:44
a,a,a-Trifluorotoluene		% Rec.	104.9	84-114	WG553000	08/30/11 23:44
Benzene	<.001	mg/kg			WG553193	08/31/11 15:50
Ethylbenzene	<.001	mg/kg			WG553193	08/31/11 15:50
Toluene	<.005	mg/kg			WG553193	08/31/11 15:50
Total Xylenes	<.003	mg/kg			WG553193	08/31/11 15:50
4-Bromofluorobenzene		% Rec.	95.22	59-140	WG553193	08/31/11 15:50
Dibromofluoromethane		% Rec.	105.5	63-139	WG553193	08/31/11 15:50
Toluene-d8		% Rec.	107.1	84-116	WG553193	08/31/11 15:50
a,a,a-Trifluorotoluene		% Rec.	100.4	80-118	WG553193	08/31/11 15:50
TPH (GC/FID) Low Fraction a,a,a-Trifluorotoluene(FID)	<.1	mg/kg % Rec.	106.3	59-128	WG553022	08/31/11 06:36
TPH (GC/FID) Low Fraction a,a,a-Trifluorotoluene(FID)	<.1	mg/kg % Rec.	98.10	59-128	WG553282	09/01/11 14:33
TPH (GC/FID) High Fraction o-Terphenyl	<4	ppm % Rec.	84.13	50-150	WG553224	09/03/11 11:48
TPH (GC/FID) High Fraction o-Terphenyl	<4	ppm % Rec.	79.25	50-150	WG553225	09/03/11 12:22
TPH (GC/FID) Low Fraction a,a,a-Trifluorotoluene(FID)	<.1	mg/kg % Rec.	92.54	59-128	WG553342	09/01/11 16:44
1,2,4-Trichlorobenzene	<.333	mg/kg			WG553395	09/03/11 09:34
2,4,6-Trichlorophenol	<.333	mg/kg			WG553395	09/03/11 09:34
2,4-Dichlorophenol	<.333	mg/kg			WG553395	09/03/11 09:34
2,4-Dimethylphenol	<.333	mg/kg			WG553395	09/03/11 09:34
2,4-Dinitrophenol	<.333	mg/kg			WG553395	09/03/11 09:34
2,4-Dinitrotoluene	<.333	mg/kg			WG553395	09/03/11 09:34
2,6-Dinitrotoluene	<.333	mg/kg			WG553395	09/03/11 09:34
2-Chloronaphthalene	<.033	mg/kg			WG553395	09/03/11 09:34
2-Chlorophenol	<.333	mg/kg			WG553395	09/03/11 09:34
2-Nitrophenol	<.333	mg/kg			WG553395	09/03/11 09:34
3,3-Dichlorobenzidine	<.333	mg/kg			WG553395	09/03/11 09:34
4,6-Dinitro-2-methylphenol	<.333	mg/kg			WG553395	09/03/11 09:34
4-Bromophenyl-phenylether	<.333	mg/kg			WG553395	09/03/11 09:34
4-Chloro-3-methylphenol	<.333	mg/kg			WG553395	09/03/11 09:34
4-Chlorophenyl-phenylether	<.333	mg/kg			WG553395	09/03/11 09:34

* Performance of this Analyte is outside of established criteria.

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L A B S C I E N C E S

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Quality Assurance Report
Level II

L533490

September 08, 2011

Analyte	Result	Laboratory Units	Blank % Rec	Limit	Batch	Date Analyzed
4-Nitrophenol	< .333	mg/kg			WG553395	09/03/11 09:34
Acenaphthene	< .333	mg/kg			WG553395	09/03/11 09:34
Acenaphthylene	< .333	mg/kg			WG553395	09/03/11 09:34
Anthracene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzidine	< .333	mg/kg			WG553395	09/03/11 09:34
Benzo(a)anthracene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzo(a)pyrene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzo(b)fluoranthene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzo(g,h,i)perylene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzo(k)fluoranthene	< .333	mg/kg			WG553395	09/03/11 09:34
Benzylibutyl phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Bis(2-chloroethoxy)methane	< .333	mg/kg			WG553395	09/03/11 09:34
Bis(2-chloroethyl)ether	< .333	mg/kg			WG553395	09/03/11 09:34
Bis(2-chloroisopropyl)ether	< .333	mg/kg			WG553395	09/03/11 09:34
Bis(2-ethylhexyl)phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Chrysene	< .033	mg/kg			WG553395	09/03/11 09:34
Di-n-butyl phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Di-n-octyl phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Dibenzo(a,h)anthracene	< .333	mg/kg			WG553395	09/03/11 09:34
Diethyl phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Dimethyl phthalate	< .333	mg/kg			WG553395	09/03/11 09:34
Fluoranthene	< .033	mg/kg			WG553395	09/03/11 09:34
Fluorene	< .033	mg/kg			WG553395	09/03/11 09:34
Hexachloro-1,3-butadiene	< .333	mg/kg			WG553395	09/03/11 09:34
Hexachlorobenzene	< .333	mg/kg			WG553395	09/03/11 09:34
Hexachlorocyclopentadiene	< .333	mg/kg			WG553395	09/03/11 09:34
Hexachloroethane	< .333	mg/kg			WG553395	09/03/11 09:34
Indeno(1,2,3-cd)pyrene	< .033	mg/kg			WG553395	09/03/11 09:34
Isophorone	< .333	mg/kg			WG553395	09/03/11 09:34
n-Nitrosodi-n-propylamine	< .333	mg/kg			WG553395	09/03/11 09:34
n-Nitrosodimethylamine	< .333	mg/kg			WG553395	09/03/11 09:34
n-Nitrosodiphenylamine	< .333	mg/kg			WG553395	09/03/11 09:34
Naphthalene	< .033	mg/kg			WG553395	09/03/11 09:34
Nitrobenzene	< .333	mg/kg			WG553395	09/03/11 09:34
Pentachlorophenol	< .333	mg/kg			WG553395	09/03/11 09:34
Phenanthrene	< .033	mg/kg			WG553395	09/03/11 09:34
Phenol	< .333	mg/kg			WG553395	09/03/11 09:34
Pyrene	< .033	mg/kg			WG553395	09/03/11 09:34
2,4,6-Tribromophenol		mg/kg	78.97	16-136	WG553395	09/03/11 09:34
2-Fluorobiphenyl		mg/kg	80.09	37-119	WG553395	09/03/11 09:34
2-Fluorophenol		mg/kg	80.32	22-114	WG553395	09/03/11 09:34
Nitrobenzene-d5		mg/kg	68.88	20-114	WG553395	09/03/11 09:34
Phenol-d5		mg/kg	93.22	26-127	WG553395	09/03/11 09:34
p-Terphenyl-d14		mg/kg	80.99	15-174	WG553395	09/03/11 09:34
TPH (GC/FID) High Fraction	X X X X X 4 X X	ppm			WG554018	09/08/11 10:41
o-Terphenyl		% Rec.	71.57	50-150	WG554018	09/08/11 10:41

Analyte	Units	Laboratory Known Val	Control Result	Sample % Rec	Limit	Batch
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.47	99.4	67-135	WG553023
a,a,a-Trifluorotoluene(FID)	mg/l	.025	0.0236	94.2	59-128	WG553023
Benzene	mg/l	.025	0.0236	94.2	67-126	WG553000
Ethylbenzene	mg/l	.025	0.0255	102.	76-129	WG553000
Toluene	mg/l	.025	0.0236	94.3	72-122	WG553000

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Analyte	Units	Laboratory Control Known Val	Sample Result	% Rec	Limit	Batch
Total Xylenes	mg/l	.075	0.0763	102.	75-128	WG553000
4-Bromofluorobenzene				98.13	75-128	WG553000
Dibromofluoromethane				93.58	79-125	WG553000
Toluene-d8				102.2	87-114	WG553000
a,a,a-Trifluorotoluene				104.6	84-114	WG553000
Benzene	mg/kg	.025	0.0259	103.	65-128	WG553193
Ethylbenzene	mg/kg	.025	0.0242	96.7	74-128	WG553193
Toluene	mg/kg	.025	0.0252	101.	70-120	WG553193
Total Xylenes	mg/kg	.075	0.0739	98.5	74-127	WG553193
4-Bromofluorobenzene				99.95	59-140	WG553193
Dibromofluoromethane				105.1	63-139	WG553193
Toluene-d8				107.9	84-116	WG553193
a,a,a-Trifluorotoluene				99.51	80-118	WG553193
TPH (GC/FID) Low Fraction	mg/kg	5.5	6.29	114.	67-135	WG553022
a,a,a-Trifluorotoluene(FID)				114.1	59-128	WG553022
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.21	94.8	67-135	WG553282
a,a,a-Trifluorotoluene(FID)				105.8	59-128	WG553282
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.47	99.5	67-135	WG553342
a,a,a-Trifluorotoluene(FID)				96.64	59-128	WG553342
1,2,4-Trichlorobenzene	mg/kg	.333	0.213	64.0	48-87	WG553395
2,4,6-Trichlorophenol	mg/kg	.333	0.234	70.4	50-98	WG553395
2,4-Dichlorophenol	mg/kg	.333	0.241	72.3	56-96	WG553395
2,4-Dimethylphenol	mg/kg	.333	0.254	76.3	52-101	WG553395
2,4-Dinitrophenol	mg/kg	.333	0.221	66.4	10-109	WG553395
2,4-Dinitrotoluene	mg/kg	.333	0.218	65.5	54-103	WG553395
2,6-Dinitrotoluene	mg/kg	.333	0.226	67.8	53-99	WG553395
2-Chloronaphthalene	mg/kg	.333	0.222	66.7	55-96	WG553395
2-Chlorophenol	mg/kg	.333	0.229	68.7	52-88	WG553395
2-Nitrophenol	mg/kg	.333	0.245	73.5	55-106	WG553395
3,3-Dichlorobenzidine	mg/kg	.333	0.183	54.8	36-84	WG553395
4,6-Dinitro-2-methylphenol	mg/kg	.333	0.216	64.7	24-98	WG553395
4-Bromophenyl-phenylether	mg/kg	.333	0.221	66.4	58-111	WG553395
4-Chloro-3-methylphenol	mg/kg	.333	0.250	75.1	58-98	WG553395
4-Chlorophenyl-phenylether	mg/kg	.333	0.220	66.1	59-103	WG553395
4-Nitrophenol	mg/kg	.333	0.215	64.5	34-101	WG553395
Acenaphthene	mg/kg	.333	0.222	66.7	55-96	WG553395
Acenaphthylene	mg/kg	.333	0.239	71.7	61-107	WG553395
Anthracene	mg/kg	.333	0.235	70.6	58-105	WG553395
Benzidine	mg/kg	.333	0.0486	14.6	10-21	WG553395
Benzo(a)anthracene	mg/kg	.333	0.232	69.6	56-103	WG553395
Benzo(a)pyrene	mg/kg	.333	0.236	71.0	57-103	WG553395
Benzo(b)fluoranthene	mg/kg	.333	0.243	72.9	52-106	WG553395
Benzo(g,h,i)perylene	mg/kg	.333	0.259	77.7	47-112	WG553395
Benzo(k)fluoranthene	mg/kg	.333	0.242	72.6	53-104	WG553395
Benzylbutyl phthalate	mg/kg	.333	0.253	75.9	61-118	WG553395
Bis(2-chloroethoxy)methane	mg/kg	.333	0.239	71.7	58-104	WG553395
Bis(2-chloroethyl)ether	mg/kg	.333	0.234	70.1	51-103	WG553395
Bis(2-chloroisopropyl)ether	mg/kg	.333	0.241	72.5	56-95	WG553395
Bis(2-ethylhexyl)phthalate	mg/kg	.333	0.249	74.9	56-120	WG553395

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Analyte	Units	Laboratory Known Val	Control Val	Sample Result	% Rec	Limit	Batch
Chrysene	mg/kg	.333		0.222	66.5	55-102	WG553395
Di-n-butyl phthalate	mg/kg	.333		0.230	69.2	59-114	WG553395
Di-n-octyl phthalate	mg/kg	.333		0.252	75.8	51-119	WG553395
Dibenz(a,h)anthracene	mg/kg	.333		0.255	76.5	49-111	WG553395
Diethyl phthalate	mg/kg	.333		0.225	67.7	61-105	WG553395
Dimethyl phthalate	mg/kg	.333		0.221	66.2	60-106	WG553395
Fluoranthene	mg/kg	.333		0.229	68.9	59-108	WG553395
Fluorene	mg/kg	.333		0.217	65.1	59-100	WG553395
Hexachloro-1,3-butadiene	mg/kg	.333		0.237	71.1	53-106	WG553395
Hexachlorobenzene	mg/kg	.333		0.218	65.3	50-108	WG553395
Hexachlorocyclopentadiene	mg/kg	.333		0.164	49.3	36-117	WG553395
Hexachloroethane	mg/kg	.333		0.230	69.2	45-83	WG553395
Indeno(1,2,3-cd)pyrene	mg/kg	.333		0.252	75.8	50-110	WG553395
Isophorone	mg/kg	.333		0.208	62.5	51-99	WG553395
n-Nitrosodi-n-propylamine	mg/kg	.333		0.250	75.0	52-103	WG553395
n-Nitrosodimethylamine	mg/kg	.333		0.221	66.4	31-107	WG553395
n-Nitrosodiphenylamine	mg/kg	.333		0.241	72.3	57-121	WG553395
Naphthalene	mg/kg	.333		0.234	70.4	55-91	WG553395
Nitrobenzene	mg/kg	.333		0.246	73.8	47-92	WG553395
Pentachlorophenol	mg/kg	.333		0.203	61.0	10-89	WG553395
Phenanthrene	mg/kg	.333		0.235	70.5	55-103	WG553395
Phenol	mg/kg	.333		0.239	71.8	49-99	WG553395
Pyrene	mg/kg	.333		0.231	69.3	54-104	WG553395
2,4,6-Tribromophenol					82.23	16-136	WG553395
2-Fluorobiphenyl					82.72	37-119	WG553395
2-Fluorophenol					88.63	22-114	WG553395
Nitrobenzene-d5					85.92	20-114	WG553395
Phenol-d5					97.86	26-127	WG553395
p-Terphenyl-d14					83.58	15-174	WG553395

Analyte	Units	Laboratory Result	Control Ref	Sample %Rec	Duplicate	Limit	RPD	Limit	Batch
TPH (GC/FID) Low Fraction	mg/kg	5.36	5.47	97.0		67-135	1.95	20	WG553023
a,a,a-Trifluorotoluene(FID)	mg/kg			109.2		59-128			WG553023
Benzene	mg/l	0.0263	0.0236	105.		67-126	10.9	20	WG553000
Ethylbenzene	mg/l	0.0289	0.0255	115.		76-129	12.5	20	WG553000
Toluene	mg/l	0.0252	0.0236	101.		72-122	6.83	20	WG553000
Total Xylenes	mg/l	0.0843	0.0763	112.		75-128	10.0	20	WG553000
4-Bromofluorobenzene				101.7		75-128			WG553000
Dibromofluoromethane				96.01		79-125			WG553000
Toluene-d8				98.99		87-114			WG553000
a,a,a-Trifluorotoluene				101.8		84-114			WG553000
Benzene	mg/kg	0.0257	0.0259	103.		65-128	0.810	20	WG553193
Ethylbenzene	mg/kg	0.0238	0.0242	95.0		74-128	1.42	20	WG553193
Toluene	mg/kg	0.0246	0.0252	98.0		70-120	2.47	20	WG553193
Total Xylenes	mg/kg	0.0712	0.0739	95.0		74-127	3.64	20	WG553193
4-Bromofluorobenzene				96.37		59-140			WG553193
Dibromofluoromethane				105.3		63-139			WG553193
Toluene-d8				107.4		84-116			WG553193
a,a,a-Trifluorotoluene				99.30		80-118			WG553193
TPH (GC/FID) Low Fraction	mg/kg	6.45	6.29	117.		67-135	2.58	20	WG553022
a,a,a-Trifluorotoluene(FID)	mg/kg			114.0		59-128			WG553022

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Analyte	Units	Laboratory		Control	Sample	Duplicate	Limit	RPD	Limit	Batch
		Result	Ref	%Rec						
TPH (GC/FID) Low Fraction	mg/kg	5.45	5.21	99.0		67-135	4.48	20		WG553282
a,a,a-Trifluorotoluene(FID)				104.1		59-128				WG553282
TPH (GC/FID) Low Fraction	mg/kg	5.22	5.47	95.0		67-135	4.71	20		WG553342
a,a,a-Trifluorotoluene(FID)				92.33		59-128				WG553342
1,2,4-Trichlorobenzene	mg/kg	0.191	0.213	57.0		48-87	10.8	20		WG553395
2,4,6-Trichlorophenol	mg/kg	0.220	0.234	66.0		50-98	6.25	20		WG553395
2,4-Dichlorophenol	mg/kg	0.224	0.241	67.0		56-96	7.15	20		WG553395
2,4-Dimethylphenol	mg/kg	0.226	0.254	68.0		52-101	11.9	20		WG553395
2,4-Dinitrophenol	mg/kg	0.220	0.221	66.0		10-109	0.427	39		WG553395
2,4-Dinitrotoluene	mg/kg	0.225	0.218	67.0		54-103	2.97	20		WG553395
2,6-Dinitrotoluene	mg/kg	0.219	0.226	66.0		53-99	2.94	20		WG553395
2-Chloronaphthalene	mg/kg	0.209	0.222	63.0		55-96	6.24	20		WG553395
2-Chlorophenol	mg/kg	0.214	0.229	64.0		52-88	6.61	20		WG553395
2-Nitrophenol	mg/kg	0.218	0.245	65.0		55-106	11.6	20		WG553395
3,3-Dichlorobenzidine	mg/kg	0.183	0.183	55.0		36-84	0.197	20		WG553395
4,6-Dinitro-2-methylphenol	mg/kg	0.223	0.216	67.0		24-98	3.50	32		WG553395
4-Bromophenyl-phenylether	mg/kg	0.232	0.221	70.0		58-111	4.93	20		WG553395
4-Chloro-3-methylphenol	mg/kg	0.236	0.250	71.0		58-98	5.81	20		WG553395
4-Chlorophenyl-phenylether	mg/kg	0.213	0.220	64.0		59-103	3.16	20		WG553395
4-Nitrophenol	mg/kg	0.217	0.215	65.0		34-101	1.26	26		WG553395
Acenaphthene	mg/kg	0.218	0.222	65.0		55-96	1.83	20		WG553395
Acenaphthylene	mg/kg	0.227	0.239	68.0		61-107	5.18	20		WG553395
Anthracene	mg/kg	0.219	0.235	66.0		58-105	7.09	20		WG553395
Benzidine	mg/kg	0.0493	0.0486	15.0		10-21	1.54	40		WG553395
Benzo(a)anthracene	mg/kg	0.222	0.232	67.0		56-103	4.15	20		WG553395
Benzo(a)pyrene	mg/kg	0.224	0.236	67.0		57-103	5.23	20		WG553395
Benzo(b)fluoranthene	mg/kg	0.215	0.243	65.0		52-106	12.0	20		WG553395
Benzo(g,h,i)perylene	mg/kg	0.230	0.259	69.0		47-112	11.8	20		WG553395
Benzo(k)fluoranthene	mg/kg	0.219	0.242	66.0		53-104	10.0	20		WG553395
Benzylbutyl phthalate	mg/kg	0.238	0.253	72.0		61-118	5.90	20		WG553395
Bis(2-chlorethoxy)methane	mg/kg	0.220	0.239	66.0		58-104	8.31	20		WG553395
Bis(2-chloroethyl)ether	mg/kg	0.225	0.234	67.0		51-103	3.92	20		WG553395
Bis(2-chloroisopropyl)ether	mg/kg	0.223	0.241	67.0		56-95	8.03	20		WG553395
Bis(2-ethylhexyl)phthalate	mg/kg	0.243	0.249	73.0		56-120	2.75	20		WG553395
Chrysene	mg/kg	0.218	0.222	66.0		55-102	1.52	20		WG553395
Di-n-butyl phthalate	mg/kg	0.235	0.230	70.0		59-114	1.88	20		WG553395
Di-n-octyl phthalate	mg/kg	0.244	0.252	73.0		51-119	3.20	22		WG553395
Dibenz(a,h)anthracene	mg/kg	0.238	0.255	72.0		49-111	6.73	20		WG553395
Diethyl phthalate	mg/kg	0.223	0.225	67.0		61-105	1.23	20		WG553395
Dimethyl phthalate	mg/kg	0.219	0.221	66.0		60-106	0.702	20		WG553395
Fluoranthene	mg/kg	0.227	0.229	68.0		59-108	0.926	20		WG553395
Fluorene	mg/kg	0.222	0.217	67.0		59-100	2.35	20		WG553395
Hexachloro-1,3-butadiene	mg/kg	0.211	0.237	63.0		53-106	11.7	20		WG553395
Hexachlorobenzene	mg/kg	0.211	0.218	63.0		50-108	3.11	20		WG553395
Hexachlorocyclopentadiene	mg/kg	0.168	0.164	50.0		36-117	2.54	20		WG553395
Hexachloroethane	mg/kg	0.206	0.230	62.0		45-83	11.3	20		WG553395
Indeno(1,2,3-cd)pyrene	mg/kg	0.233	0.252	70.0		50-110	7.86	20		WG553395
Isophorone	mg/kg	0.178	0.208	53.0		51-99	15.5	20		WG553395
n-Nitrosodi-n-propylamine	mg/kg	0.224	0.250	67.0		52-103	10.8	20		WG553395
n-Nitrosodimethylamine	mg/kg	0.197	0.221	59.0		31-107	11.7	23		WG553395
n-Nitrosodiphenylamine	mg/kg	0.235	0.241	70.0		57-121	2.52	20		WG553395
Naphthalene	mg/kg	0.212	0.234	64.0		55-91	9.94	20		WG553395
Nitrobenzene	mg/kg	0.214	0.246	64.0		47-92	13.9	20		WG553395
Pentachlorophenol	mg/kg	0.190	0.203	57.0		10-89	6.88	28		WG553395
Phenanthrene	mg/kg	0.221	0.235	66.0		55-103	5.89	20		WG553395

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Est. 1970

Quality Assurance Report
Level II

L533490

September 08, 2011

Analyte	Units	Laboratory Result	Control Ref	Sample %Rec	Duplicate	Limit	RPD	Limit	Batch
Phenol	mg/kg	0.224	0.239	67.0	49-99	6.45	20	WG553395	
Pyrene	mg/kg	0.217	0.231	65.0	54-104	6.21	20	WG553395	
2,4,6-Tribromophenol				84.93	16-136			WG553395	
2-Fluorobiphenyl				76.23	37-119			WG553395	
2-Fluorophenol				76.28	22-114			WG553395	
Nitrobenzene-d5				74.60	20-114			WG553395	
Phenol-d5				89.97	26-127			WG553395	
p-Terphenyl-d14				72.90	15-174			WG553395	

Analyte	Units	Matrix MS Res	Spike Ref Res	TV	% Rec	Limit	Ref Samp	Batch
TPH (GC/FID) Low Fraction	mg/kg	19.9	0	5.5	72.5	55-109	L533490-20	WG553023
a,a,a-Trifluorotoluene(FID)					100.6	59-128		WG553023
Benzene	mg/l	0.0462	0.0170	.025	117.	16-158	L533246-01	WG553000
Ethylbenzene	mg/l	0.155	0.120	.025	142.	29-150	L533246-01	WG553000
Toluene	mg/l	0.0270	0.000630	.025	105.	22-152	L533246-01	WG553000
Total Xylenes	mg/l	0.268	0.170	.075	131.	27-151	L533246-01	WG553000
4-Bromofluorobenzene					101.4	75-128		WG553000
Dibromofluoromethane					98.28	79-125		WG553000
Toluene-d8					99.85	87-114		WG553000
a,a,a-Trifluorotoluene					101.6	84-114		WG553000
Benzene	mg/kg	0.134	0	.025	107.	16-143	L533739-06	WG553193
Ethylbenzene	mg/kg	0.111	0	.025	89.1	12-137	L533739-06	WG553193
Toluene	mg/kg	0.124	0	.025	99.2	12-136	L533739-06	WG553193
Total Xylenes	mg/kg	0.295	0	.075	78.6	10-138	L533739-06	WG553193
4-Bromofluorobenzene					95.44	59-140		WG553193
Dibromofluoromethane					106.2	63-139		WG553193
Toluene-d8					108.3	84-116		WG553193
a,a,a-Trifluorotoluene					97.88	80-118		WG553193
TPH (GC/FID) Low Fraction	mg/kg	28.2	0	5.5	103.	55-109	L533474-17	WG553022
a,a,a-Trifluorotoluene(FID)					111.0	59-128		WG553022
TPH (GC/FID) Low Fraction	mg/kg	20.4	0.0725	5.5	74.0	55-109	L533660-22	WG553282
a,a,a-Trifluorotoluene(FID)					101.9	59-128		WG553282
TPH (GC/FID) Low Fraction	mg/kg	23.6	0	5.5	85.8	55-109	L533821-02	WG553342
a,a,a-Trifluorotoluene(FID)					96.82	59-128		WG553342
1,2,4-Trichlorobenzene	mg/kg	0.249	0	.333	74.9	27-118	L533676-02	WG553395
2,4,6-Trichlorophenol	mg/kg	0.268	0	.333	80.5	18-140	L533676-02	WG553395
2,4-Dichlorophenol	mg/kg	0.257	0	.333	77.3	30-134	L533676-02	WG553395
2,4-Dimethylphenol	mg/kg	0.174	0	.333	52.3	13-147	L533676-02	WG553395
2,4-Dinitrophenol	mg/kg	0.267	0	.333	80.1	10-110	L533676-02	WG553395
2,4-Dinitrotoluene	mg/kg	0.273	0	.333	81.9	12-146	L533676-02	WG553395
2,6-Dinitrotoluene	mg/kg	0.278	0	.333	83.4	10-150	L533676-02	WG553395
2-Chloronaphthalene	mg/kg	0.270	0	.333	81.1	31-127	L533676-02	WG553395
2-Chlorophenol	mg/kg	0.252	0	.333	75.6	26-120	L533676-02	WG553395
2-Nitrophenol	mg/kg	0.285	0	.333	85.6	10-156	L533676-02	WG553395
3,3-Dichlorobenzidine	mg/kg	0.00370	0	.333	1.11*	10-127	L533676-02	WG553395

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Analyte	Units	Matrix		Spike	% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
4,6-Dinitro-2-methylphenol	mg/kg	0.268	0	.333	80.4	10-124	L533676-02	WG553395
4-Bromophenyl-phenylether	mg/kg	0.264	0	.333	79.3	27-150	L533676-02	WG553395
4-Chloro-3-methylphenol	mg/kg	0.279	0	.333	83.8	24-140	L533676-02	WG553395
4-Chlorophenyl-phenylether	mg/kg	0.259	0	.333	77.8	27-142	L533676-02	WG553395
4-Nitrophenol	mg/kg	0.279	0	.333	83.6	10-166	L533676-02	WG553395
Acenaphthene	mg/kg	0.271	0	.333	81.5	30-132	L533676-02	WG553395
Acenaphthylene	mg/kg	0.287	0	.333	86.1	31-144	L533676-02	WG553395
Anthracene	mg/kg	0.270	0	.333	81.0	27-140	L533676-02	WG553395
Benzidine	mg/kg	0.0209	0	.333	6.28*	10-55	L533676-02	WG553395
Benzo(a)anthracene	mg/kg	0.272	0	.333	81.6	22-139	L533676-02	WG553395
Benzo(a)pyrene	mg/kg	0.282	0	.333	84.6	16-148	L533676-02	WG553395
Benzo(b)fluoranthene	mg/kg	0.280	0	.333	84.0	13-152	L533676-02	WG553395
Benzo(g,h,i)perylene	mg/kg	0.182	0	.333	54.6	10-137	L533676-02	WG553395
Benzo(k)fluoranthene	mg/kg	0.293	0	.333	87.9	15-152	L533676-02	WG553395
Benzylbutyl phthalate	mg/kg	0.315	0	.333	94.6	20-168	L533676-02	WG553395
Bis(2-chloroethoxy)methane	mg/kg	0.281	0	.333	84.3	32-141	L533676-02	WG553395
Bis(2-chloroethyl)ether	mg/kg	0.323	0	.333	97.1	25-139	L533676-02	WG553395
Bis(2-chloroisopropyl)ether	mg/kg	0.264	0	.333	79.3	32-128	L533676-02	WG553395
Bis(2-ethylhexyl)phthalate	mg/kg	0.317	0	.333	95.2	20-163	L533676-02	WG553395
Chrysene	mg/kg	0.261	0	.333	78.4	20-139	L533676-02	WG553395
Di-n-butyl phthalate	mg/kg	0.289	0	.333	86.7	24-149	L533676-02	WG553395
Di-n-octyl phthalate	mg/kg	0.331	0	.333	99.5	14-164	L533676-02	WG553395
Dibenz(a,h)anthracene	mg/kg	0.203	0	.333	60.8	10-137	L533676-02	WG553395
Diethyl phthalate	mg/kg	0.279	0	.333	83.9	28-142	L533676-02	WG553395
Dimethyl phthalate	mg/kg	0.267	0	.333	80.2	31-142	L533676-02	WG553395
Fluoranthene	mg/kg	0.282	0	.333	84.6	24-145	L533676-02	WG553395
Fluorene	mg/kg	0.274	0	.333	82.3	30-138	L533676-02	WG553395
Hexachloro-1,3-butadiene	mg/kg	0.271	0	.333	81.5	29-136	L533676-02	WG553395
Hexachlorobenzene	mg/kg	0.237	0	.333	71.1	26-136	L533676-02	WG553395
Hexachlorocyclopentadiene	mg/kg	0.125	0	.333	37.5	10-124	L533676-02	WG553395
Hexachloroethane	mg/kg	0.263	0	.333	79.0	21-107	L533676-02	WG553395
Indeno(1,2,3-cd)pyrene	mg/kg	0.203	0	.333	61.1	10-139	L533676-02	WG553395
Isophorone	mg/kg	0.234	0	.333	70.4	26-134	L533676-02	WG553395
n-Nitrosodi-n-propylamine	mg/kg	0.289	0	.333	86.8	24-141	L533676-02	WG553395
n-Nitrosodimethylamine	mg/kg	0.270	0	.333	81.2	18-126	L533676-02	WG553395
n-Nitrosodiphenylamine	mg/kg	0.272	0	.333	81.6	16-128	L533676-02	WG553395
Naphthalene	mg/kg	0.263	0	.333	78.9	31-124	L533676-02	WG553395
Nitrobenzene	mg/kg	0.286	0	.333	85.8	22-122	L533676-02	WG553395
Pentachlorophenol	mg/kg	0.247	0	.333	74.1	10-124	L533676-02	WG553395
Phenanthrene	mg/kg	0.279	0	.333	83.7	25-139	L533676-02	WG553395
Phenol	mg/kg	0.247	0	.333	74.0	22-129	L533676-02	WG553395
Pyrene	mg/kg	0.275	0	.333	82.6	23-145	L533676-02	WG553395
2,4,6-Tribromophenol					93.60	16-136		WG553395
2-Fluorobiphenyl					100.2	37-119		WG553395
2-Fluorophenol					88.07	22-114		WG553395
Nitrobenzene-d5					97.17	20-114		WG553395
Phenol-d5					102.4	26-127		WG553395
p-Terphenyl-d14					84.44	15-174		WG553395
TPH (GC/FID) High Fraction	mg/kg	435.	410.	60	8.19*	50-150	L534392-16	WG554018
o-Terphenyl					91.33	50-150		WG554018

Analyte	Units	Matrix		Spike	Duplicate	Limit	RPD	Limit Ref Samp	Batch
		MSD	Ref	%Rec					
TPH (GC/FID) Low Fraction	mg/kg	20.9	19.9	75.9	55-109	4.64	20	L533490-20	WG553023
a,a,a-Trifluorotoluene(FID)				102.2	59-128				WG553023

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Analyte	Units	Matrix	Spike	Duplicate	Limit	RPD	Limit	Ref	Samp	Batch
Benzene	mg/l	0.0444	0.0462	110.	16-158	3.82	21	L533246-01	WG553000	
Ethylbenzene	mg/l	0.156	0.155	142.	29-150	0.160	24	L533246-01	WG553000	
Toluene	mg/l	0.0267	0.0270	104.	22-152	0.960	22	L533246-01	WG553000	
Total Xylenes	mg/l	0.265	0.268	127.	27-151	1.10	23	L533246-01	WG553000	
4-Bromofluorobenzene				104.1	75-128				WG553000	
Dibromofluoromethane				96.01	79-125				WG553000	
Toluene-d8				99.66	87-114				WG553000	
a,a,a-Trifluorotoluene				101.2	84-114				WG553000	
Benzene	mg/kg	0.107	0.134	85.8	16-143	21.9	31	L533739-06	WG553193	
Ethylbenzene	mg/kg	0.0804	0.111	64.3	12-137	32.4	36	L533739-06	WG553193	
Toluene	mg/kg	0.0971	0.124	77.6	12-136	24.4	32	L533739-06	WG553193	
Total Xylenes	mg/kg	0.175	0.295	46.7	10-138	51.0*	36	L533739-06	WG553193	
4-Bromofluorobenzene				97.23	59-140				WG553193	
Dibromofluoromethane				109.2	63-139				WG553193	
Toluene-d8				107.5	84-116				WG553193	
a,a,a-Trifluorotoluene				96.88	80-118				WG553193	
TPH (GC/FID) Low Fraction	mg/kg	24.9	28.2	90.4	55-109	12.7	20	L533474-17	WG553022	
a,a,a-Trifluorotoluene(FID)				109.0	59-128				WG553022	
TPH (GC/FID) Low Fraction	mg/kg	17.2	20.4	62.2	55-109	17.3	20	L533660-22	WG553282	
a,a,a-Trifluorotoluene(FID)				100.0	59-128				WG553282	
TPH (GC/FID) Low Fraction	mg/kg	22.3	23.6	81.2	55-109	5.39	20	L533821-02	WG553342	
a,a,a-Trifluorotoluene(FID)				95.17	59-128				WG553342	
1,2,4-Trichlorobenzene	mg/kg	0.249	0.249	74.7	27-118	0.293	23	L533676-02	WG553395	
2,4,6-Trichlorophenol	mg/kg	0.268	0.268	80.4	18-140	0.0825	26	L533676-02	WG553395	
2,4-Dichlorophenol	mg/kg	0.278	0.257	83.6	30-134	7.84	23	L533676-02	WG553395	
2,4-Dimethylphenol	mg/kg	0.168	0.174	50.4	13-147	3.69	27	L533676-02	WG553395	
2,4-Dinitrophenol	mg/kg	0.256	0.267	77.0	10-110	4.00	40	L533676-02	WG553395	
2,4-Dinitrotoluene	mg/kg	0.284	0.273	85.4	12-146	4.16	25	L533676-02	WG553395	
2,6-Dinitrotoluene	mg/kg	0.274	0.278	82.3	10-150	1.34	23	L533676-02	WG553395	
2-Chloronaphthalene	mg/kg	0.267	0.270	80.2	31-127	1.12	23	L533676-02	WG553395	
2-Chlorophenol	mg/kg	0.270	0.252	81.1	26-120	7.05	21	L533676-02	WG553395	
2-Nitrophenol	mg/kg	0.280	0.285	84.2	10-156	1.67	24	L533676-02	WG553395	
3,3-Dichlorobenzidine	mg/kg	0.00353	0.00370	1.06*	10-127	4.57	40	L533676-02	WG553395	
4,6-Dinitro-2-methylphenol	mg/kg	0.240	0.268	72.0	10-124	11.0	40	L533676-02	WG553395	
4-Bromophenyl-phenylether	mg/kg	0.261	0.264	78.4	27-150	1.08	20	L533676-02	WG553395	
4-Chloro-3-methylphenol	mg/kg	0.277	0.279	83.1	24-140	0.770	22	L533676-02	WG553395	
4-Chlorophenyl-phenylether	mg/kg	0.251	0.259	75.4	27-142	3.13	21	L533676-02	WG553395	
4-Nitrophenol	mg/kg	0.279	0.279	83.9	10-166	0.341	35	L533676-02	WG553395	
Acenaphthene	mg/kg	0.285	0.271	85.7	30-132	5.02	21	L533676-02	WG553395	
Acenaphthylene	mg/kg	0.285	0.287	85.7	31-144	0.479	24	L533676-02	WG553395	
Anthracene	mg/kg	0.267	0.270	80.0	27-140	1.25	20	L533676-02	WG553395	
Benzidine	mg/kg	0	0.0209	0*	10-55	200.*	36	L533676-02	WG553395	
Benzo(a)anthracene	mg/kg	0.274	0.272	82.2	22-139	0.720	22	L533676-02	WG553395	
Benzo(a)pyrene	mg/kg	0.298	0.282	89.5	16-148	5.60	21	L533676-02	WG553395	
Benzo(b)fluoranthene	mg/kg	0.294	0.280	88.4	13-152	5.03	24	L533676-02	WG553395	
Benzo(g,h,i)perylene	mg/kg	0.179	0.182	53.8	10-137	1.42	32	L533676-02	WG553395	
Benzo(k)fluoranthene	mg/kg	0.306	0.293	91.8	15-152	4.28	22	L533676-02	WG553395	
Benzylbutyl phthalate	mg/kg	0.313	0.315	93.9	20-168	0.710	23	L533676-02	WG553395	

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YOUR LAB OF CHOICE

AECOM Inc. - Fort Collins, CO
Mr. Dustin Krajewski
1601 Prospect Parkway
Fort Collins, CO 80525

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Quality Assurance Report
Level II

L533490

September 08, 2011

Analyte	Units	Matrix	MSD	Spike Ref	%Rec	Duplicate	Limit	RPD	Limit	Ref Samp	Batch
Bis(2-chloroethoxy)methane	mg/kg	0.290	0.281	87.0		32-141	3.16	20	L533676-02	WG553395	
Bis(2-chloroethyl)ether	mg/kg	0.305	0.323	91.4		25-139	6.04	26	L533676-02	WG553395	
Bis(2-chloroisopropyl)ether	mg/kg	0.282	0.264	84.7		32-128	6.57	22	L533676-02	WG553395	
Bis(2-ethylhexyl)phthalate	mg/kg	0.316	0.317	94.9		20-163	0.338	24	L533676-02	WG553395	
Chrysene	mg/kg	0.269	0.261	80.9		20-139	3.13	23	L533676-02	WG553395	
Di-n-butyl phthalate	mg/kg	0.296	0.289	88.8		24-149	2.35	24	L533676-02	WG553395	
Di-n-octyl phthalate	mg/kg	0.340	0.331	102.		14-164	2.47	24	L533676-02	WG553395	
Dibenz(a,h)anthracene	mg/kg	0.199	0.203	59.6		10-137	1.94	29	L533676-02	WG553395	
Diethyl phthalate	mg/kg	0.280	0.279	84.1		28-142	0.237	23	L533676-02	WG553395	
Dimethyl phthalate	mg/kg	0.272	0.267	81.7		31-142	1.83	22	L533676-02	WG553395	
Fluoranthene	mg/kg	0.268	0.282	80.5		24-145	4.93	29	L533676-02	WG553395	
Fluorene	mg/kg	0.259	0.274	77.9		30-138	5.52	22	L533676-02	WG553395	
Hexachloro-1,3-butadiene	mg/kg	0.280	0.271	84.0		29-136	2.98	22	L533676-02	WG553395	
Hexachlorobenzene	mg/kg	0.237	0.237	71.2		26-136	0.0746	20	L533676-02	WG553395	
Hexachlorocyclopentadiene	mg/kg	0.116	0.125	34.8		10-124	7.43	33	L533676-02	WG553395	
Hexachloroethane	mg/kg	0.280	0.263	84.2		21-107	6.36	27	L533676-02	WG553395	
Indeno(1,2,3-cd)pyrene	mg/kg	0.200	0.203	60.1		10-139	1.59	32	L533676-02	WG553395	
Isophorone	mg/kg	0.236	0.234	71.0		26-134	0.864	20	L533676-02	WG553395	
n-Nitrosodi-n-propylamine	mg/kg	0.294	0.289	88.2		24-141	1.52	20	L533676-02	WG553395	
n-Nitrosodimethylamine	mg/kg	0.291	0.270	87.4		18-126	7.47	27	L533676-02	WG553395	
n-Nitrosodiphenylamine	mg/kg	0.264	0.272	79.4		16-128	2.72	25	L533676-02	WG553395	
Naphthalene	mg/kg	0.266	0.263	80.0		31-124	1.36	25	L533676-02	WG553395	
Nitrobenzene	mg/kg	0.283	0.286	85.0		22-122	0.963	20	L533676-02	WG553395	
Pentachlorophenol	mg/kg	0.243	0.247	72.8		10-124	1.74	34	L533676-02	WG553395	
Phenanthrene	mg/kg	0.274	0.279	82.4		25-139	1.55	25	L533676-02	WG553395	
Phenol	mg/kg	0.258	0.247	77.6		22-129	4.64	25	L533676-02	WG553395	
Pyrene	mg/kg	0.273	0.275	82.1		23-145	0.538	30	L533676-02	WG553395	
2,4,6-Tribromophenol				93.48		16-136					WG553395
2-Fluorobiphenyl				93.40		37-119					WG553395
2-Fluorophenol				91.68		22-114					WG553395
Nitrobenzene-d5				98.83		20-114					WG553395
Phenol-d5				106.7		26-127					WG553395
p-Terphenyl-d14				84.21		15-174					WG553395

Batch number /Run number / Sample number cross reference

WG553023: R1839232: L533490-20 22 24 28
WG553000: R1839333: L533490-33
WG553193: R1839712: L533490-07 26 28
WG553022: R1839775: L533490-02 04 06 08 10 12 14 16 18
WG552959: R1839852: L533490-01 03 05 09 11 13 15 17 19 21 23 25 29 31
WG553282: R1843934: L533490-07
WG553224: R1844512: L533490-02 04 06 07 08 10 12 14 16 18
WG553225: R1844513: L533490-22 24 26 27 28 30 32
WG553342: R1844992: L533490-26 27 30 32
WG553395: R1845212: L533490-07
WG554018: R1849995: L533490-20

* * Calculations are performed prior to rounding of reported values.

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Quality Assurance Report
Level II

L533490

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Est. 1970

September 08, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

AECOM
1601 Prospect Parkway
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Project Description: Encana-Pavillion, WY		Billing Information:			Analysis/Container/Preservative			CoCode Template/Prelogin Shipped Via: Remarks/Contaminant Sample # (lab only)
Report to: <u>Dustin Krajewski</u> Email to: <u>dustin.krajewski@aecon.com</u>								
Phone: 970-530-3516 FAX: 970-493-0213	Client Project #: 60196941	City/Site Collected: Pavillion, WY			BTEX (USEPA Method 8260)	TPH-DRO & GRO (USEPA Method 8015)	SVOC ^a (USEPA Method 8071)	
Collected by: <u>Chris Ahrendt</u> <i>Closey'd Adult</i>	Site/Facility ID#: 2t-9	P.O. #:						
Collected by (signature):	Rush? (Lab MUST Be Notified)	Date Results Needed:	No. of Cntrs					
	<input type="checkbox"/> Same Day.....200%							
	<input type="checkbox"/> Next Day.....100%	Email? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes						
	<input type="checkbox"/> Two Day.....50%	FAX? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes						
	<input type="checkbox"/> Three Day.....25%							
Immediately Packed on Ice N								
Sample ID	Comp/Grab	Matrix*	Depth	Date	Time			
(21-9)(SB-1-1)(0-1)	Grab	SS	(0-1)	8/25/11	1535	1	X	1533490-01
(21-9)(SB-1-1)(13-15')			(13-15')	8/25/11	1540	2	X	02
(21-9)(SB-2-1)(0-1')			(0-1')	8/25/11	16:15	1	X	03
(21-9)(SB-2-1)(13-15')			(13-15')	8/25/11	16:20	2	X	04
(21-9)(SB-3-1)(0-1)			(0-1)	8/26/11	0840	1	X	05
(21-9)(SB-3-1)(4-6')			(4-6')	8/26/11	0845	2	X	06
(21-9)(SB-3-1)(6-8')			(6-8')	8/26/11	0850	2	X X	07
(21-9)(SB-3-1)(13-15')	→	→	(13-15')	8/26/11	0855	2	X	08
(21-9)(SB-4-1)(0-1')	Grab	SS	(0-1')	8/26/11	0915	1	X	09

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other *Two Blank*

pH Temp

Remarks

4827 0553 5837

Flow Other

Relinquished by: (Signature) <i>John A. Davis</i>	Date: 8/29/11	Time: 1630	Received by: (Signature) <i>FED EX</i>	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: <i>(Lab use only)</i>
Relinquished by: (Signature) <i>FED EX</i>	Date: 8/30/11	Time:	Received by: (Signature)	Temp: 3.4°C Bottles Received: 52	CoC Seals Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by (Signature) <i>John A. Davis</i>	Date: 8/30/11	Time: 1700 pH Checked: <input type="checkbox"/> NCF: <input type="checkbox"/>

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Billing Information:

Chain of Custody
Page 2 of 4



L-A-B S-C-I-E-N-C-E-S

12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

Project Description: Encana - Pavilion, WY
Phone: 970-530-3516 Client Project #: 601 969 41
FAX: 970-493-0213 Collected: Pavilion, WY
Collected by: Chris Ahrenst P.O. #:
Site/Facility ID#: Z1-9

Collected by (signature):

Chris Ahrenst

Immediately Packed on Ice N Y

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Analysis/Container/Preservative		
							Date Results Needed:	Email? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	FAX? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
(Z)-9/(SB-4-1)(13-15)	Grab	SS	13-15	8/26/11	0920	2	X		
(Z)-9/(SB-5-1)(0-1)	Grab	SS	0-1	8/26/11	0940	1		X	
(Z)-9/(SB-5-1)(13-15)	Grab	SS	13-15	8/26/11	0945	2	X		
(Z)-9/(SB-6-1)(0-1)	Grab	SS	0-1	8/26/11	1010	1		X	
(Z)-9/(SB-6-1)(13-15)	Grab	SS	13-15	8/26/11	1015	2	X		
(Z)-9/(SB-7-1)(0-1)	Grab	SS	0-1	8/26/11	1055	1		X	
(Z)-9/(SB-7-1)(13-15)	Grab	SS	13-15	8/26/11	1055	2	X		
(Z)-9/(SB-8-1)(0-1)	Grab	SS	0-1	8/26/11	1120	1		X	
(Z)-9/(SB-8-1)(13-15)	Grab	SS	13-15	8/26/11	1125	2	X		

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other *Trip Blank*

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Relinquished by: (Signature) <i>Chris Ahrenst</i>	Date: 8/29/11	Time: 1630	Received by: (Signature) <i>FED EX</i>	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: (lab use only) <i>o</i>
Relinquished by: (Signature) <i>FED EX</i>	Date: 8/30/11	Time:	Received by: (Signature)	Temp: 34°C Bottles Received: 52	CoC Seals Intact: Y N NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) <i>Chris Ahrenst</i>	Date: 8/30/11 Time: 0400	pH Checked: NCF:

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Billing Information:

Analysis/Container/Preservative

Chain of Custody
Page 4 of 4



L-A-B S-C-I-E-N-C-E-S

12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

Project Description: Encana - Pavilion, WY		City/State Collected: Pavilion, WY
Phone: 970-530-3516	Client Project #:	ESC Key:
FAX: 970-493-0213	601 969 41	
Collected by: Chris Ahrenst	Site/Facility ID#:	P.O. #:
Collected by (signature): <i>Christopher Ahrenst</i>	Rush? (Lab MUST Be Notified)	Date Results Needed:
	<input type="checkbox"/> Same Day.....200%	No. of Cntrs
	<input type="checkbox"/> Next Day.....100%	
	<input type="checkbox"/> Two Day.....50%	
	<input type="checkbox"/> Three Day.....25%	

Immediately Packed on Ice N

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	BTEX (USEPA Method 8260)	TPH-PRO&GRD (USEPA Method 8015)	SVOCs (USEPA Method 8071)	(SAR) - Sodium Adsorption Ratio	CoCode (lab use only)	Template/Prelogin	Shipped Via:	Remarks/Contaminant	Sample # (lab only)
(21-9)(DUP-1)	Grab	SS	-	8/26/11	-	Z X X				LS33490-28				
(21-9)(SB-13-11)(0-1")	Grab	SS	0-1	8/26/11	1345	1		X		29				
(21-9)(SB-13-11)(B-15")	Grab	SS	13-15	8/26/11	1350	Z	X			30				
(21-9)(SB-14-11)(0-1")	Grab	SS	0-1	8/26/11	1410	1		X		31				
(21-9)(SB-14-11)(B-15")	Grab	SS	13-15	8/26/11	1415	Z	X			32				
Trip Blank L-1	Grab	OT	-	8/25/11	0800	Z X				33				
CQA and blank														

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other *Trip Blank*

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Relinquished by: (Signature) <i>Christopher Ahrenst</i>	Date: 8/29/11	Time: 1630	Received by: (Signature) <i>FED EX</i>	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: (lab use only) <input checked="" type="checkbox"/>	
Relinquished by: (Signature) <i>FED EX</i>	Date: 8/30/11	Time:	Received by: (Signature)	Temp: 34°	Bottles Received: 52	CoC Seals Intact: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 8/30/11	Time: 0900	pH Checked: NCF:

EPAPAV0045774



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Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Report Summary

Wednesday September 14, 2011

Report Number: L535435

Samples Received: 09/10/11

Client Project: 60221849

Description: EnCana Pavillion

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Leslie Newton
Leslie Newton, ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915

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Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-1-11 TP-21-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

ESC Sample # : L535435-01

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	5.1				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.
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REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-02

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-2-11 TP-21-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	0.83				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-03

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-3-11 TP-21-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	12.				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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1601 Prospect Parkway
Fort Collins, CO 80525

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-4-11 TP-21-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

ESC Sample # : L535435-04

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	17.				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

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1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-05

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-5-11 TP-21-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	2.7				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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EPAPAV0045780



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REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-06

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-1-11 TP-31-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	3.1				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-07

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-2-11 TP-31-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	9.0				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.
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Reported: 09/14/11 11:40 Printed: 09/14/11 11:40

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EPAPAV0045782



12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

September 14, 2011

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

ESC Sample # : L535435-08

Date Received : September 10, 2011
Description : EnCana Pavillion
Sample ID : BG-3-11 TP-31-9
Collected By : Dawn Fairchild
Collection Date : 09/07/11 15:20

Site ID :

Project # : 60221849

Parameter	Result	Det.	Limit	Units	Method	Date	Dil.
Sodium Adsorption Ratio	2.0				Calc.	09/13/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.
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Reported: 09/14/11 11:40 Printed: 09/14/11 11:40

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EPAPAV0045783

Summary of Remarks For Samples Printed
09/14/11 at 11:40:27

TSR Signing Reports: 044
R5 - Desired TAT

Always run BTEX by 8260 unless noted otherwise. In 9/2/11

Sample: L535435-01 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-02 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-03 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-04 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-05 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-06 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-07 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40
Sample: L535435-08 Account: ENSRFCCO Received: 09/10/11 11:30 Due Date: 09/16/11 00:00 RPT Date: 09/14/11 11:40



YOUR LAB OF CHOICE

AECOM Inc. - Fort Collins, CO
Mr. Dustin Krajewski
1601 Prospect Parkway
Fort Collins, CO 80525

Quality Assurance Report
Level II

L535435

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Est. 1970

September 14, 2011

Batch number /Run number / Sample number cross reference

WG554628: R1857192: L535435-01 02 03 04 05 06 07 08

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



YOUR LAB OF CHOICE

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Mr. Dustin Krajewski
1601 Prospect Parkway
Fort Collins, CO 80525

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September 14, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

AECOM, Inc.
1601 Prospect Pkwy.
Fort Collins, CO 80525

Alternate billing information:

Chain of Custody
Page ____ of ____

Prepared by:

**ENVIRONMENTAL
SCIENCE CORP.**

12065 Lebanon Road
Mt. Juliet, TN 37122

Phone (615) 758-5858
Phone (800) 767-5859
FAX (615) 758-5859

Project Description: EnCana Pavillion City/State Collected WY

Phone: 970-493-8878
FAX:

Client Project #:

60221849

ESC Key:

ENSRFCCO-ENCANAP

Collected by:

Dawn Fauchild

Site/Facility ID#:

Pavillion WY

P.O.#:

Collected by (signature):

Dawn Fauchild

Packed on Ice N

Y

Rush? (Lab MUST Be Notified)

Same Day 200%
Next Day 100%
Two Day 50%

Date Results Needed:

Email? No Yes
FAX? No Yes

No. of Cntrs

SAR

CoCode ENSRFCCO (lab use only)

Template/Prelogin

E145

Shipped Via:

Remarks/Contaminant Sample # (lab only)

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Remarks/Contaminant	Sample # (lab only)
BG-1-11(TP-21-9)	Grab	SS	0-1	09-07-11	15:20	1	X	L535435-01
BG-2-11(TP-21-9)			0-1	09-07-11	15:30	1	X	-02
BG-3-11(TP-21-9)			0-1	09-07-11	15:35	1	X	-03
BG-4-11(TP-21-9)			0-1	09-07-11	15:40	1	X	-04
BG-5-11(TP-21-9)			0-1	09-07-11	15:45	1	X	-05
BG-6-11(TP-31-9)			0-1	09-07-11	16:05	1	X	-06
BG-7-11(TP-31-9)			0-1	09-07-11	16:10	1	X	-07
BG-8-11(TP-31-9)	↓	↓	0-1	09-07-11	16:15	1	X	-08

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____

pH _____ Temp _____

Remarks:

2 coolers | cooler

8734 3433 0317

Flow _____ Other _____

Relinquished by: (Signature) <i>Dawn Fauchild</i>	Date: 09-07-11	Time: 1700	Received by: (Signature)	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: <i>OK</i> (lab use only)
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: <i>ns</i> 3.1 Bottles Received: <i>8-4oz</i>	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9-10-11 Time: 118° pH Checked: NCF:	